The "AQUITANIA"— SUPPLEMENTS issued with this Number: Deck Plans, etc., 'Aquitania' (2 sheets) and INDEX to Vol. 36.

No. 443. (Vol. XXXVII.—*Part* I.) *Estab'd 1879.* AUGUST, 1914. MONTHLY, PRICE 6d.; by Post, 8d.
Entered at Stationers' Hall. *Registered for transmission by Canadian Magazine Post.*

Vol. 37 1914-15

THE MARINE ENGINEER

AND NAVAL ARCHITECT.

AN ILLUSTRATED JOURNAL OF

Marine Engineering, Shipbuilding, Steam Navigation & Electrical Engineering

LIBRARY
AUG 19 1914
UNIVERSITY OF TORONTO

OFFICES: 3, AMEN CORNER, PATERNOSTER ROW, LONDON, E.C.

LION
PACKINGS
JOHN WILKES, SONS & MAPPLEBECK, BIRMINGHAM. Ltd.,
Manufacturers of BRASS AND COPPER **TUBES**
For Locomotive & Marine Boilers, Condensers, etc.
METALS, WIRE, Etc.

WOODITE COMPANY,
Sole Manufacturers and Patentees of—
Woodite Gauge Glass Rings, Packing Rings, Pump Cups, Sheetings, etc.
MITCHAM COMMON, SURREY.
Prices and Particulars on application.

PATENTS
in all Countries. ***E. P. ALEXANDER & SON,*** Chartered Patent Agents, ***306, High Holborn, London, W.C.*** (Formerly of Southampton Bldgs.)
Pamphlet and General Advice Gratis.
Designs and Trade Marks Registered.
Estd. 1874. TELEPHONE 7424 CENTRAL.

M. B. COHN, - - -
Toldbodvej, 22, & Freeport,
COPENHAGEN. - - -
Telegrams—"AMIANTE."
Importer of Machinery and - - - Engineers' Furnishings
Sole Agent for . .
Messrs. Higginson & Co., Liverpool, Cargo Blocks and Coal Gins.
Blake Boiler, Wagon & Engineering Co., Ld., Darlington, Patent Donkey Boiler.
The Sturrock Patent Bridge & Engineering Co.
M. Wawn & Son, Sunderland, Propellors.
The Bowring Petroleum Co., Ltd., London.
First-class references to English firms of good standing.

CRANE'S OILS
FOR MARINE ENGINES & CYLINDERS
London, Manchester, Liverpool
TRADE MARK

On Admiralty List.
ATLAS ANTI-FRICTION ALLOYS are specially manufactured by a staff of expert Metallurgists whose duties are to maintain the high reputation of Atlas Alloys. Particular attention is directed for MARINE WORK to our
TENAXAS A.1.
PLASTIC METAL.
Has withstood severe experimental tests most satisfactorily. Compression test 5·878 tons per square inch.
Price compares most favourably with similar metals on the market.
In the interests of efficiency, WRITE NOW, and investigate.
The ATLAS METAL and ALLOYS CO., Ltd.
52, QUEEN VICTORIA STREET, LONDON, E.C.

FORGINGS, STAMPINGS, CASTINGS, SHEETS, RODS, BOLTS, WIRE, TUBES, EXTRUDED BARS OF ANY SECTION.
REGISTERED DELTA METAL TRADE MARK
MANGANESE BRONZE, NAVAL BRASS, COPPER, YELLOW METAL, BABBITTS,
To Admiralty and other requirements. Etc.
THE DELTA METAL Co., Ltd.
EAST GREENWICH, LONDON, S.E.
Contractors to the Admiralty, War Office, India Office, etc.

IRON **TUBES** STEEL
Stewarts AND Lloyds, Ltd.,
Glasgow and Birmingham.

DERMATINE
SPECIALITIES. SEE PAGE XIX.

"BITUMASTIC." See page XXVII.

Index to Contents, see Page XIII.
Index to Advertisers, see page XI.
Classified Index to ditto see page VII.

THE BEST ASBESTOS AND METALLIC PACKING.
Sold by all SHIP CHANDLERS
DURFLEX PATENT.
EVERY LENGTH STAMPED
Manufactured by
DAVID MOSELEY & SONS, LTD.,
Ardwick, Manchester

The **BROUGHTON COPPER CO., LTD.**
MANCHESTER.
Copper Smelters and Manufacturers.
COPPER, BRASS AND BRONZE TUBES
For Marine, Locomotive, and other Purposes.
INGOTS, RODS, SHEETS, PLATES, etc.
ELECTRO-COPPERING ALLOYS.

PATENTS
WHITE & WOODINGTON,
Chartered Patent Agents,
221—225, Bank Chambers,
29, Southampton Buildings, London.
FOURTY-FOUR YEARS' EXPERIENCE.
MARINE SUBJECTS A SPECIALITY.
Telephone 4991 Holborn. Tele. Ad.: "Decachord, London."

TUCK'S GENUINE PACKINGS
Also see Advertisement. Page XXII.

Excelsior Packing
See Back Cover.

PACKING AND STEAM TRAPS

The Finest in the World. Fitted on Britain's Largest Liner.

R.M.S. "AQUITANIA."

The United States Metallic Packing Co., Ltd., Soho Works, BRADFORD, YORKS.

LONDON: 116, Fenchurch St., Tel. No.: Avenue 2710; LIVERPOOL: 15, Fenwick St.; GLASGOW: 52, St. Enoch Sq.; NEWCASTLE: 2, Collingwood St.; SWANSEA: Pembroke Bldgs.; Belfast, Hull, Bristol, Cardiff, etc.

NOMOS

"NOMOS"

ANTI-CORROSIVE AND ANTI-FOULING

COMPOSITIONS.

FOR COATING SHIPS' BOTTOMS.

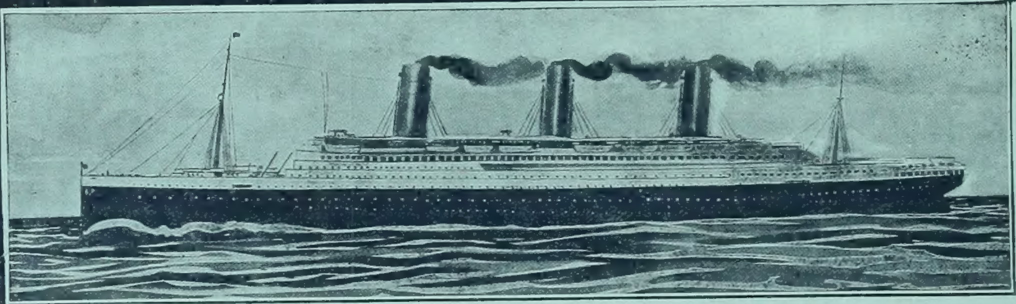
Agents and Stocks at all Principal Ports.

NOMOS

Also "**FAROLA**" Anti-Corrosive Compositions for Ships' Holds Emigrant Fittings, Boot Tops, Etc.

Sole Manufacturers: **R. T. BRUCE & Co.,** Sitwell Street, Groves, HULL.

Telegraphic Address: "COMPO., HULL."



Send for Free working samples.

FOR STEAM PRESSURES in the MERCHANT MARINE and NAVAL SERVICE a packing is needed that will withstand the destroying element of high pressures and superheat when added, and give LONG and RELIABLE SERVICE.

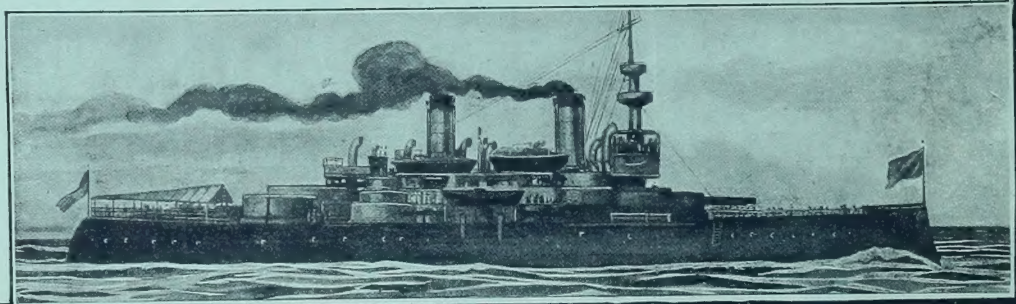
"PALMETTO" packing has a well-established reputation for long service under the most extreme conditions.

"PALMETTO" CAN BE SECURED IN ANY PORT.

Greene, Tweed & Co.,

Sole Manufacturers,

41, Tothill St., Westminster, LONDON, S.W.



Weir Auxiliaries *fitted on* **R.M.S. "Aquitania"**

Uniflux Condensers—Main and Auxiliary.
Dual Main Air Pumps.
Monotype Auxiliary Air Pumps.
Feed Pumps—Main and Auxiliary.
Hotwell Pumps.
Feed Heaters—Direct Contact and Uniflux Types.
Forced Lubrication Pumps.
Oil Service Pumps.
Condensed Water and Hot Salt Water Pumps.
Hydraulic Pressure Pumps to operate Stone-Lloyd System of Watertight Doors.

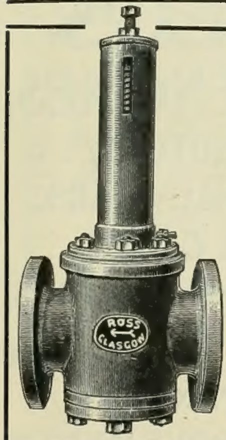
G. & J. WEIR, Ltd., Cathcart, Glasgow.

THE YORKSHIRE COPPER WORKS, LTD.,
LEEDS.

Have supplied Tubes for the following Dreadnoughts, viz.: "Queen Mary," "Audacious," "Princess Royal," "Lion," "Monarch" "King George V.," "Thunderer," "Orion," "Centurion," "Conqueror," "Benbow," "New Zealand," "Iron Duke," "Marlborough," "Tiger." "Delhi," "Queen Elizabeth," "Warspite," "Valiant."

SOLID DRAWN TUBES COPPER, BRASS, GUN-METAL

Sole Makers of BEMAL Brass Condenser Tubes.



ROSS'S "DUPLEX" REDUCING VALVES.
On Admiralty List.

These Valves are of the Equilibrium Type, perfectly balanced, and without rubber parts. They are extremely sensitive and can be regulated to reduce to the lowest pressures working in any position. Combined, if required, with Relief Valve.

WM. ROSS & SONS,
27c, Thistle Street, S.S.,
GLASGOW.
PRICES ON APPLICATION.

VICKERS' PATENT APPLIANCES
For PROTECTING and LUBRICATING
TAIL SHAFTS

Corrosion and Rust Prevented.
Friction Reduced, and Speed Increased.
Simple. Strong. Effective.
No Springs used.

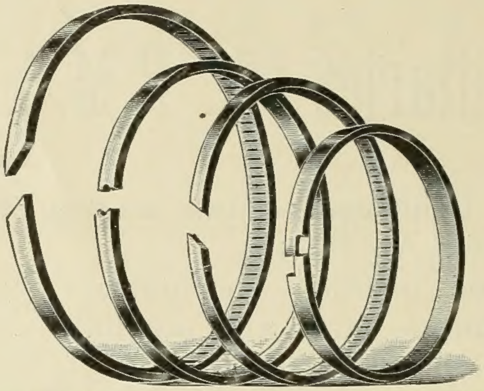
Benjn R. Vickers & Sons, Ltd., Leeds.
Telegrams—"Vickers, Leeds." Telephone No. 449.

THE

Standard Piston Ring & Engineering
CO., LTD.

PREMIER WORKS,
DON ROAD, SHEFFIELD.

Telephone No. 2149.
Telegrams: "Ocean" Sheffield.



Cast-Iron Hammered Piston Rings
(by the Patent Davy Robertson Process).

IN OUR
Special Piston Ring Iron. . .

All Sizes up to 72 in.

Sample and prices on demand.

Modern Plant for Quick Work.
Machinery run by Electricity.
Vessels Dry Docked and Painted.
Propeller Work a speciality.

ESTIMATES AND RATES ON APPLICATION.
MODERATE CHARGES.

North East Coast Engineering Works (Hull) Limited.

Telegrams: "Efficient, Hull."
Nat. Telephone, 1835
" " 3087 Residence.
" " 1186 "

Engineers, Boilermakers,
Ship Repairers, Electrical Engineers,
Brass Founders, Coppersmiths & Blacksmiths.

Joint Managing Directors: E. W. & J. CLARKE, Wyke Street,
Hedon Road, near Alexandra and Victoria Docks.

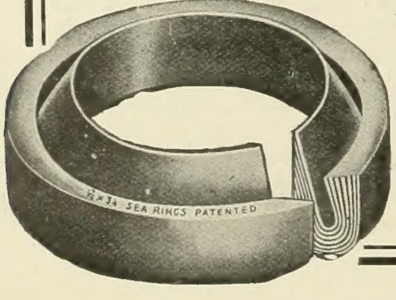
S.E.A.
RINGS

For just that extra amount of high grade finish—that extra bit of quality—which some consider unnecessary—the hand-made accuracy of S.E.A. Rings is famed.

They are made in sizes ranging from ½ in. up to 2¼ in., and for diameters beginning at ⅞ in. and increasing by $\frac{1}{16}$ in. up to 30 in.

A trial order means that your future and further supplies in Rod, Cylinder and Ram Packing will all bear the S.E.A. Rings brand, not because of what we say, but by reason of your own opinions of S.E.A. Ring products, after using them.

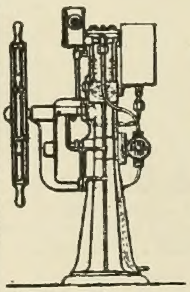
RONALD TRIST & CO.
Limited
Makers of the well-known Thermofeed Regulator or Boiler Feed Controller,
4, Lloyds Av.,
London, E.C.,
England.
Branches at
GLASGOW
LIVERPOOL
MANCHESTER
PARIS, Etc.
Telegrams and Cablegrams: "Resvalar," London-Glasgow and Manchester.
Telephone: "Avenue 6200 (2 lines) London



Brown Bros. & Co. Ltd.
ROSEBANK IRONWORKS,
. . EDINBURGH.

Telegrams: HYDRAULIC.
Code Used: A. B. C. 5TH EDITION.
— ON ADMIRALTY LIST. —
Telephone: 16, CENTRAL.

MAKERS OF THE HIGHEST CLASS
— OF —
STEERING GEARS,
REVERSING ENGINES,
. . TELEMOTORS, . .
HELM SIGNAL GEARS,
HYDRAULIC CARGO . . INSTALLATIONS,
WITH OUR 1907 and 1908 PATENTS AND IMPROVEMENTS.



Patent Telemotor.

RAMSAY'S ANTICIPATING MARINE GOVERNOR.

RACING PREVENTED,
NOT MERELY STOPPED.

FULL PARTICULARS:

RAMSAY'S MARINE ENGINEERING CO., LTD.,
Leadenhall Chambers, 4, St. Mary Axe, London, E.C.
or THE LIVERPOOL PATENTS Co., Ltd., Derby Square, Liverpool.

SELL'S Directory of REGISTERED TELEGRAPHIC . ADDRESSES .

WITH TELEPHONE NUMBERS.

The Inland Abbreviated Addresses are from Official Lists supplied by Authority of the Postmaster-General.

The Volume also Contains the

National Directory of Large Commercial Houses and Buyers' Guide and the Cable Addresses of Important Business Houses in the British Empire Overseas and Foreign Countries.

Telegraphic Tariffs, List of Consuls, Trade Marks and Brands, Etc.

Founded by HENRY SELL.

29th ANNUAL ISSUE. "Invaluable to the Business Man."

An accurate Commercial Address Book for the whole Kingdom.

A telephone as well as a telegraphic Directory.

Contains description of firms and all the information necessary for the various modes of communication.

25s.

Offices: 166, FLEET STREET, E.C.

Telegraphic Address: "Sell, Fleet London."
Telephone Number: Holborn 1693.

SMOOTH-ON

TRADE MARK - REG. U.S. PAT. OFF.

IRON CEMENTS

Permanently stop all leaks of Steam, Water, Fire or Oil.

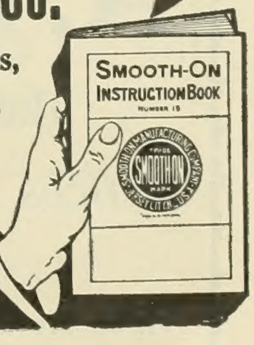
Easy to apply.

Send for free 104-page illustrated instruction book. It will save you time and money.

Smooth-On Mfg. Co.

8, White St., Moorfields,
LONDON, E.C.

Hong Kong Agents:—
CARMICHAEL & CLARK.



Established 1882.

The Direct Photo Engraving Co., Ld.

Directors:
F. E. S. PERRY. JOHN SWAIN.

38, FARRINGDON STREET, E.C.

Photo Engravers and Etchers by all processes. Blockmakers on Copper and Zinc, suitable for MAGAZINE, CATALOGUE, and NEWSPAPER ILLUSTRATION. Engineering Photographs retouched and worked up for reproduction by most experienced Artists. A specimen block will be supplied, free of all charge, to any engineering or other firm contemplating the production of a Catalogue, from own photographs.

For Prices, Specimens and full particulars apply to the Company—

38, FARRINGDON STREET, LONDON, E.C.

'Phone: 1066, Central.

McLEAN'S PATENT DECKED LIFE-BOAT

MEETS ALL BOARD OF TRADE REQUIREMENTS.

Adopted in Preference to all other Decked Life boats by the Cunard S.S. Co., and other large ocean shipping companies.

Great Stability. Superior Adaptability for Stowage. Perfect Water-Freeing Powers by R.N.L. Inst. Relieving Valves.

The Central Sunk Well in the "McLean" Boat is a feature which contributes very largely towards the Buoyancy, Efficiency and Safety of the Boat, also the Freedom of Movement of the Rowers.

For Prices and Full Particulars apply to—

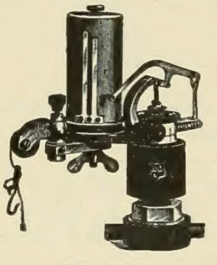
HUGH McLEAN & SON, Ure Street, GOVAN.

THE

"McINNES·DOBBIE"

(Latest Form of our "McINNES")

INDICATOR



PATTERN A.
Enclosed Spring Type

Adopted by the Admiralty and by the leading Engine Builders.

EXTENSIVELY SPECIFIED BY SHIPOWNERS

In 2 Types: External & Enclosed Spring

Small Size Indicators for Torpedo Boats.

SOLE MAKERS:

DOBBIE, McINNES, Ltd.

57, BOTHWELL ST., GLASGOW.

And at Greenock, South Shields & London.

AVOID IMITATIONS OF OUR OLD McINNES INDICATOR

IMPORTANT TO SHIPOWNERS AND SUPERINTENDENTS.

HILL'S ELECTRICAL ALARM

Worked in conjunction with Bridge Telegraphs and Reversing Engine.

The only Device which gives anticipatory indication of a wrong movement of the main or reversing engine.

Price and full particulars from—and full-size working model may be seen at:—

TELFORD, GRIER & MACKAY, 16, Carrick St., GLASGOW.

The "STONE-LLOYD" System

OF HYDRAULICALLY OPERATED BULKHEAD DOORS.
As fitted on the principal
GERMAN, FRENCH & BRITISH TRANSATLANTIC LINERS.

J. STONE & CO., LTD., Deptford, LONDON, S.E.

Subscription One Year 7/6

Including Postage.

Subscribe NOW.

SHIPPING, ENGINEERING & MACHINERY EXHIBITION.

OLYMPIA, 1914.

EXHIBITORS requiring a stand erected on hire inexpensively and to L.C.C. requirements should get in touch with . . .

A. ELMES & Co., Ltd.

The Official Standfitters by Appointment.

Offices: 347, Upper Street, ISLINGTON, N.
Stores: KENSINGTON, W.

'Phone 271 NORTH. DESIGNS and ESTIMATES FREE.

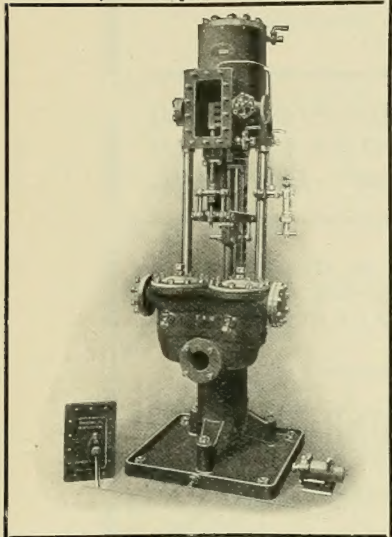
WARNER PUMPS

FOR ALL MARINE DUTIES

ANTHONY'S PATENT. Equipped with the famous mechanically operated UNIT system of Steam Distribution.

POINTS OF SUPERIORITY.

UNEQUALLED simplicity and economy. Balanced working parts, making it the most nearly frictionless gear extant. Working parts entirely steam jacketted. Greatest possible accessibility for examination, renewal and repair, as the valve unit (constituting the whole of the working parts) can be instantly withdrawn on removing a single cover, without upsetting any adjustment, or breaking a single pipe joint. Repairs reduced to an absolute minimum, and brought within the reach of an ordinary mechanic. Perfect reliability under all conditions. **Extraordinary ease of starting and sweetness of running.**



Standard Feed Pump with Valve Unit withdrawn.
Time taken by this operation, ***2 minutes.***

ROBERT WARNER & CO. (Eng.) Ltd.
Contractors to H.M. Admiralty, Etc.,
WALTON-ON-THE-NAZE.

London Offices: 25, VICTORIA STREET, WESTMINSTER, S.W.

CLASSIFIED INDEX TO ADVERTISERS.

For reference to the following Firms' advertisements, see page xi.

ACADEMIES.
Bennett College, The, Regent Street, Sheffield
City Marine Engineering, 4 & 5, Aldgate High Street, London, E.C.
Hawthorn's Marine Engineering, 41, East India Road, London, E.
Marine Engineering College, Victoria Chambers, Working Street, Cardiff.
Marine School, Barrington Street, South Shields.
AGENCIES
ALLOYS.
Atlas Metal & Alloys Co., Ltd., 52, Queen Victoria Street, London, S.E.
Delta Metal Co., Ltd., Delta Works, East Greenwich, London, S.E.
ANTI-CORROSIVE SOLUTIONS.
Anderson & Son, Ltd., D. 5, Victoria Road, West Hartlepool, also at London and Belfast.
ANTI-FOULING COMPOSITIONS—See Compositions.
ASBESTOS GOODS
Beldam Packing and Rubber Co., 1 & 2, Gracechurch Street, London, E.C.
Cape Asbestos Co., Ltd., 23, King Street, London, E.C.
Keenan & Co., Ltd., Matthew, Tredegar Road, Bow, London, E.
Moseley & Sons, Ltd., David, Ardwick, Manchester.
Toope's Asbestos Covering Co., Ltd., Stepney Square, London, E.
Trist & Co., R., 4, Lloyd's Avenue, London, E.C.
Tuck & Co., Ltd., 61, St. Mary Axe, and 116, Cannon St., London, E.C.
Walker & Co., Ltd., Jas., Lion Works, Garford Street, West India Docks, London, E.
BELTING.
Dermatine Company, Ltd., 95, Neate Street, London, S.E.
Tuck & Co., Ltd., 61, St. Mary Axe, and 116, Cannon St., London, E.C.
BINNACLE MAKERS.
Heath & Co., Ltd., Crayford, Kent.
Kelvin, Bottomley & Baird, Ltd., 16-20, Cambridge Street, Glasgow
BLOCKS (Pulley and Cargo).
Woodall & Co., Trundle Street, Hull.
BLOW PIPES.
British Oxygen Co., Ltd., Elverton Street, Westminster, London, S.W.
BOAT AND BARGE BUILDERS.
Rutherford & Co., A., Neptune Works, Birkenhead.
BOAT GEAR.
Greenfield, Capt. W. J., 12, The Quay, Waterford, Ireland.
BOILER COMPOSITION AND PRESERVATIVES.
Keenan & Co., Ltd., Matthew, Tredegar Road, Bow, London, E.
Ross, Hotchkiss & Co., Ltd., Arthur, 1, Glengall Rd , Old Kent Rd., London, S.E.
BOILER FEED PUMPS.
Warner & Co. (Eng.), Ltd., R., Walton-on-the-Naze.
BOILER MAKERS.
Béliard, Crighton & Co., 7, Batavia St., Antwerp, Belgium.
Cochran & Co., Annan, Ltd., Annan, Scotland.
Cooper & Co. (of Hull) Ltd. Neptune Engine Works, Hull.
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.
Dickinson & Sons, W., Cathcart Street, Birkenhead.
North East Coast Engineering Works (Hull) Ltd., Hull.
North-Eastern Marine Engineering Co., Ltd., Wallsend-on-Tyne.
Rutherford & Co., A., Neptune Works, Bridge Street, Birkenhead.
Wallsend Slipway and Engineering Co., Ltd., Wallsend-on-Tyne.
BOILER REPAIRERS.
Anglo-Swedish Electric Arc Welding Co., Ltd., Wood Wharf, Greenwich, London, S.E.
British Arc Welding Co., Ltd., Suffolk House, Laurence Pountney Hill, London E.C.
BOILER REPAIRERS—continued.
British Oxygen Co., Ltd., Elverton Street, Westminster, London, S.W.
North-Eastern Marine Engineering Co., Ltd., Wallsend-on-Tyne.
BOILER TUBE CLEANERS.
Bromell Patents Co., Ltd., 62, Robertson Street, Glasgow, and at Liverpool.
Duncan & Co., A., 98, Victoria Street, S.W.
BOILER WATER CONTROLLERS.
BRASS TUBES.
Broughton Copper Co., Ltd., Manchester.
Mosses & Mitchell, 122-124, Golden Lane, London, E.C.
Stewarts and Lloyds, Ltd., Glasgow and Birmingham.
Wilkes, Son & Mapplebeck, Ltd., Birmingham.
Yorkshire Copper Works, Ltd., Pontefract Road, Leeds.
BULKHEAD DOORS (OPERATING).
Stone & Co., Ltd., J. Deptford, London, S.E.
CEMENT, METALLIC.
Smooth-on Manufacturing Co., 8, White Street, Moorfields, London, E.C. and Jersey City, N.J., U.S.A.
CENTRIFUGAL PUMPS.
CIRCULATORS.
Ross, Hotchkiss & Co., Ltd., Arthur, 1, Glengall Rd., Old Kent Rd., London, S.E.
COALING BARGES.
COMPASS MAKERS.
Heath & Co., Ltd., Crayford, Kent.
Kelvin, Bottomley & Baird, Ltd , 16-20, Cambridge Street, Glasgow.
COMPOSITIONS (SHIPS).
Anderson & Son, Ltd., D., 5, Victoria Road, West Hartlepool, and London and Belfast.
Briggs & Son, Ltd., William. Meadowside, Dundee.
Bruce & Co., R. T., Sitwell Street, Groves, Hull.
Wailes, Dove & Co., Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Enamel Works, Hull.
CONDENSER TUBES.
Broughton Copper Co., Ltd., Manchester.
Mosses & Mitchell, 122-124, Golden Lane, London, E.C.
Stewarts & Lloyds, Ltd., Glasgow and Birmingham.
Wilkes, Son & Mapplebeck, Ltd., Birmingham.
Yorkshire Copper Works, Ltd., Pontefract Road, Leeds.
CONDENSER TUBE CLEANERS.
Bromell Patents Co., Ltd., Glasgow and Liverpool.
CONDENSERS AND CONDENSING PLANT.
Weir, Ltd., G. & J., Cathcart, Glasgow.
Westinghouse Co., London, and Trafford Park, Manchester.
COPPERSMITHS.
Béliard, Crighton & Co., 7, Batavia St., Antwerp, Belgium.
North East Coast Engineering Works (Hull) Ltd., Hull.
COPPER TUBES.
Broughton Copper Co., Ltd., Manchester.
Mosses & Mitchell, 122-124, Golden Lane, London, E.C.
Stewarts & Lloyds, Ltd., Glasgow and Birmingham.
Wilkes, Sons & Mapplebeck, Ltd., Birmingham.
Yorkshire Copper Works, Ltd., Pontefract Road, Leeds.
COPPER WIRE.
Broughton Copper Co., Ltd., Manchester.
Wilkes, Sons & Mapplebeck, Ltd., Birmingham.

A New Book for Marine Engineers.

Brown's Slide Valve for Engineers.

Published July, 1914. By W. T. THORN. Published July, 1914.

PRICE **2/6** Net. (Per post, 2/9).

THIS work supplies a long-felt want for a book dealing with the Slide Valve in a plain, straightforward manner, because it gives just exactly what is required, and does so in a simple and quickly understood way.

It is *thoroughly illustrated*, and puts the actions of a slide valve before engineers in a style the Author has found most acceptable.

The book is written by a teacher who understands exactly the difficulties in connection with getting a grasp of the subject, and gives a candidate all that is needed for Second and First Class Board of Trade Certificates. Special reference should be made to the many cases of alterations in "setting," and also to the complete description of the valves of Weirs' pumps.

The book contains a large and valuable store of information, but is not of the nature of an encyclopædia, and the price of 2/6 places it within the reach of all.

Published by **JAMES BROWN & SON,**
52 to 58, DARNLEY ST., GLASGOW.

ELECTRIC ARC WELDING

(KJELLBERG'S PROCESS).

THE ONLY RAPID AND RELIABLE PROCESS FOR THE REPAIR OF BOILERS.

Broken, Worn or Corroded Articles of every description Repaired promptly.

Write for particulars.

THE ANGLO-SWEDISH ELECTRIC WELDING CO., LTD.,
WOOD WHARF, GREENWICH, S.E.

Telegrams: "Esabcolon, Green, London." Telephone: 679 New Cross.

Branches at—**104, Hyde Park Street, Glasgow.**
Glasshouse Street, St. Peter's, Newcastle-on-Tyne.

COUNTERS—REVOLUTION.
Dobbie. McInnes, Ltd., 57, Bothwell Street, Glasgow.
COVERINGS, BOILER, Etc.
Cape Asbestos Co., Ltd., 23, King Street, London, E.C.
Keenan & Co., Ltd., Matthew, Tredegar Road, Bow, London, E.
Toope's Asbestos Covering Co., Ltd., Stepney Square, London, E.
Wailes, Dove & Co., Ltd., 5, St. Nicholas Bldgs., Newcastle.
DOCKS.
Wallsend Slipway and Engineering Co., Ltd., Wallsend-on-Tyne.
ELECTRICAL ALARM.
Telford Grier & Mackay, 16, Carrick St., Glasgow.
ELECTRICAL ENGINEERS.
North East Coast Engineering Works (Hull), Ltd., Hull.
Westinghouse Co., London and Trafford Park, Manchester.
ELECTRICAL FITTINGS.
Graham & Co., Alfred, Crofton Park Road, London, S.E.
Kelvin, Bottomley & Baird, Ltd., 16-20, Cambridge Street, Glasgow.
Westinghouse Co., London, and Trafford Park, Manchester.
ENAMELS (See Paints and Enamels).
ELECTRIC ARC WELDING.
Anglo-Swedish Electric Welding Co., Ltd., Wood Wharf, Greenwich, S.E.
British Arc Welding Co., Ltd., Suffolk House, Laurence Pountney Hill, London, E.C.
ENGINEERS.
Béliard, Crighton & Co., 7, Batavia Street, Antwerp.
Cooper & Co. (of Hull), Ltd., Neptune Engine Works, Hull.
Day, Summers & Co., Ltd., Northam Ironworks, Southampton
Dickinson & Sons, W., Cathcart Street, Birkenhead.
Ferguson & Timpson, 104, Minories, London, E.C.
Glenfield & Kennedy, Ltd., Kilmarnock.
Hayes, Edward, Watling Works, Stony Stratford. (Small Marine).
Howden & Co., Ltd., J. 195, Scotland St., Glasgow.
North East Coast Engineering Works (Hull), Ltd., Hull.
North Eastern Marine Engineering Co., Ltd., Wallsend-on-Tyne.
Rutherford & Co., A., Neptune Works, Birkenhead.
Wallsend Slipway and Engineering Co., Ltd., Wallsend-on-Tyne.
Waygood-Otis, Ltd., Falmouth Road, London, S.E.
ENGINEERS' FURNISHERS.
Ferguson & Timpson, 104, Minories, London, E.C.
EVAPORATORS.
Weir, Ltd., G. & J., Cathcart, Glasgow.
EXHIBITIONS.
Shipping, Engineering and Machinery Exhibition, Olympia, London, W.
FAN ENGINES.
Hayes, Edward, Wolverton Station, Stony Stratford.
FANS.
Howden & Co., Ltd., Jas., 195, Scotland Street, Glasgow
Westinghouse Co., London, and Trafford Park, Manchester.
FEED FILTERS.
Glasgow Patents Co., Ltd., Wellington Works, Kinning Park, Glasgow.
FEED WATER HEATERS.
Weir, Ltd., G. & J., Cathcart, Glasgow.
FIBRE.
Mosses & Mitchell, 122, 124, Golden Lane, London, E.C.
FIRE BARS.
Liverpool Patents Co., Ltd., Derby Square, Liverpool.
FIRE EXTINCTION & FUMIGATION.
Low & Sons, Ltd., A., 78a, Merkland Street, Partick, Glasgow.
FORCED DRAUGHT.
Howden & Co., Ltd., Jas., 195, Scotland Street, Glasgow.
FOUNDERS.
Béliard, Crighton & Co., 7, Batavia Street, Antwerp, Belgium.
Bull's Metal & Melloid Co., Ltd., Yoker, near Glasgow.
Delta Metal Co., Ltd., Delta Works, East Greenwich, London, S.E
North East Coast Engineering Works (Hull), Ltd., Hull.
Wallsend Slipway and Engineering Co., Ltd., Wallsend-on-Tyne.
FURNACE BRIDGES.
Sturrock Patent Bridge and Engineering Co., 41, Reform Street, Dundee.
GAUGE GLASSES.
GAUGE GLASS RINGS.
Walker & Co., Ltd., Jas., Lion Works, Garford Street, West India Docks, E.
Woodite Company, Mitcham Common, Surrey.
GAUGES, PRESSURE, Etc.
Dobbie, McInnes, Ltd., 57, Bothwell Street, Glasgow.
GENERATORS
Westinghouse Co., London, and Trafford Park, Manchester.
GLUE, MARINE.
Briggs & Sons, Ltd., Wm., Dundee.
Jeffrey & Co., Alfred, Marsh Gate Lane, Stratford, London, E.
GOVERNORS, MARINE.
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.
Ramsay's Marine Engineering Co., Ltd., 4, St. Mary Axe, London, E.C.
GRAPHITE.
HARDWARE GOODS FOR SHIPS.
HIGH SPEED ENGINES.
HOSE AND HOSE FITTINGS.
Dermatine Company, Ltd., 95, Neate Street, London, S.E.
Tuck & Co., Ltd., 61, St. Mary Axe, & 116, Cannon St., London, E.C.
HOT WATER METERS.
Glenfield & Kennedy, Ltd., Kilmarnock.
INDIA RUBBER GOODS.
Tuck & Co., Ltd., 61, St. Mary Axe, & 116, Cannon St., London, E.C.
Walker & Co., Ltd., Jas., Lion Works, Garford Street, West India Docks, E.
INDICATORS.
Dobbie, McInnes, Ltd., 57, Bothwell Street, Glasgow.
Kelvin, Bottomley & Baird, Ltd., 16-20, Cambridge Street, Glasgow.
INDUCED DRAUGHT.
Howden & Co., Ltd., Jas., 195, Scotland Street, Glasgow.
JOINTINGS.
Cape Asbestos Co., Ltd., 23, King Street, London, E.C.
Ferguson & Timpson, 104, Minories, London, E.C.
Greene, Tweed & Co., Queen Anne's Chambers, Tothill St., London, W.C.
Hudson & Co. (succrs.), John, 79, Mansell Street, London, E.C.
Mosses & Mitchell, 122-124, Golden Lane, E.C.
Walker & Co., Ltd., Jas., Lion Works, Garford Street, West India Docks, E
Woodite Co. Mitcham Common, Surrey.
LADLES.
McNeil, Chas., Kinning Park Ironworks and Hydraulic Forge, Glasgow.
LIFEBOATS.
McLean, Hugh & Son, Ure Street, Govan, Glasgow.
LIFTS.
Waygood-Otis, Ltd., Falmouth Rd. London, S.E.

REED'S ENGINEERING BOOKS.

Containing latest Questions for Second and Chief and 14 New Plates.

Now Ready, Nineteenth Edition. **REED'S ENGINEERS' HANDBOOK** 770 Pages, **14**s net, by post **14**s **6**d.

To the Board of Trade Examinations for Certificates of competency as First and Second-Class Engineers. By W. H. THORN & SON. **With the Elementary Questions (310) and Answers.** Illustrated by 413 diagrams and 40 large plates by the Authors. This book is not only a complete and up-to-date Handbook to the Board of Trade Examinations for First and Second-Class Engineers, but is also a valuable Cyclopedia of information on Marine Steam Machinery.

Containing the Working of all the Questions given in the Examination Papers. **THE KEY TO REED'S ENGINEERS' HANDBOOK.** No purchaser of Reed's Engineers' Handbook should be without the "Key." **7**s **6**d net, by post **7**s **10**d.

JUST PUBLISHED **REED'S GUIDE TO THE USE OF THE SLIDE VALVE.**

By W. H. THORN & SON. Illustrated by 46 Diagrams and 2 Plates. Price **4**s net, by post **4**s **2**d.

REED'S GUIDE TO THE USE AND MANAGEMENT OF YACHT, TRAWLER AND LAUNCH ENGINES, including Deck and Auxiliary Machinery. By J. DENHOLM-YOUNG, M.I.N.A., Whitworth Scholar, and Gold Medallist of the North-East Coast Institution of Engineers and Shipbuilders. Illustrated by 12 plates and 80 diagrams. **6**s net, by post **6**s **5**d.

REED'S HANDBOOK FOR THE EXAMINATION OF ENGINEROOM ARTIFICERS in the British Navy. By E. R. COLLINS, M.I.S.I.W.M. Illustrated by 89 diagrams. Just issued. **4**s net, by post **4**s **3**d.

REED'S HANDBOOK TO THE EXAMINATION OF ARTIFICER ENGINEERS in the British Navy. By E. R. COLLINS, M.I.S.I.W.M. With 104 illustrations. Just out. **6**s net, by post **6**s **4**d.

REED'S STOKER'S GUIDE TO THE FIRING AND CARE OF STEAM BOILERS in the British Navy and Mercantile Marine. With 26 illustrations. Just issued. **2**s net, by post **2**s **3**d.

REED'S POLYGLOT GUIDE TO THE MARINE STEAM ENGINE. Containing the Names of 729 parts of the Engines and Boilers, in English, Français, Deutsch, Norsk, Italiano, and Español, with numerous Illustrations and Alphabetical Index. **6**s net, by post, **6**s **4**d.

THE NEW ELEMENTARY QUESTIONS (310) AND ANSWERS. With 122 illustrations. **3**s **6**d net, by post **3**s **9**d.

REED'S USEFUL HINTS TO SEAGOING ENGINEERS, and how to Repair and avoid "BREAKDOWNS." With 36 diagrams and 4 plates. **3**s **6**d net, by post **3**s **10**d.

REED'S SCREW AND WORM-WHEEL CUTTING, UP-TO-DATE. Price **2**s **6**d net, by post **2**s **8**d.

REED'S GUIDE TO THE BOARD OF TRADE EXAMINATIONS FOR EXTRA FIRST-CLASS ENGINEERS. Containing 350 Problems fully worked out, also 188 diagrams and 13 large plates. Just published—**500** pages. **18**s net, by post **18**s **5**d.

REED'S DISTANCE TABLES UP-TO-DATE. Containing over 31,000 Distances between Ports in all parts of the World, including a large number of Distances *via* the Panama Canal. 10th Edition. Revised and Enlarged. **1**s **6**d net, by post **1**s **9**d; bound leather, **2**s **6**d, by post **2**s **9**d.

REED'S MARINE BOILERS: THE CAUSES AND PREVENTION OF PRIMING, with Remarks on their General Management, and Notes on Water-Tube Boilers. With 58 illustrations **4**s **6**d net, by post **4**s **9**d.

REED'S ENGINEERS' STOCK REQUISITION, and LOG-BOOK for sea-going Engineers. 3rd Edition. **1**s **6**d net, by post **1**s **8**d.

A TREATISE ON IRON AND STEEL FOUNDING. By CLAUDE WYLIE. With 39 diagrams. **4**s **6**d net, by post **4**s **9**d.

REED'S DRAWINGS OF A TRIPLE-EXPANSION ENGINE, and Pipe Arrangements. On 2 Sheets, with Index to all parts. In Cloth Case, **3**s **6**d net, by post **3**s **9**d.

REED'S DRAWING OF A COMPOUND MARINE ENGINE, with an Index to all the parts of the Engine. In Case, **1**s **6**d net by post.

REED'S HOUSE FLAGS AND FUNNELS of BRITISH and FOREIGN STEAMSHIP COMPANIES and PRIVATE FIRMS, containing over 648 different Flags. with Alphabetical Index. 4th Edition, Revised and Enlarged. **3**s **6**d. net, by post 3s **8**d.

REED'S ELECTRIC LIGHTING FOR STEAMERS, **2**s **6**d net, by post **2**s **8**d.
ELECTRIC INSTALLATION FOR STEAMERS, **3**s net, by post **3**s **2**d.

Complete Catalogue on application.

THOMAS REED & CO.,
LIMITED,
184, HIGH STREET WEST,
SUNDERLAND.

THE MARINE SCHOOL OF SOUTH SHIELDS.

Principal,—H. R. CULLEN,
M.A., A.R.C.Sc., Whitworth Scholar.

Instructors in Engineering.

P. YOUNGSON
J. H. SHAW
J. H. PRITCHARD
Extra Chief Engineers.

Fees.

2nd Engineer, 2 guineas.
Chief ,, 3 ,,
Extra Chief Eng., 4 ,,

This School was approved in March, 1912, under the Board of Trade Regulations, to allow of time at School counting towards the 18 months' sea service.

Laboratories containing 30 ton Testing Machine, Oil Engine, Dynamo, etc.

Board of Trade Certificates gained in 1913:—Surveyor 2, Extra Chief 13, Chief Eng. 125, 2nd Eng. 154, Steam Certificate, 1; Total, 295.

Revised 11th Edition, 14/- net, now ready.
The most up-to-date Book of its kind on the market.

BERGEN'S MARINE ENGINEER

GUIDE BOOK TO THE B.O.T. EXAMS.

Greatly Enlarged, with New and Latest Questions and Valuable Drawings
Profusely illustrated by Diagrams and Large Plates by the Authors.
With the New Elementary Questions (310) and Answers.

Also **BERGEN'S**

EXTRA FIRST-CLASS ENGINEERS'

GUIDE BOOK TO THE B.O.T. EXAMS., 14/- Net.

W. J. POTTS, NORTH SHIELDS, PUBLISHER.

BEST TEXT BOOK FOR MARINE ENGINEERS.

8th EDITION. Price 12/- net.

"Verbal Notes" and Sketches for Marine Engineers, By J. W. M. SOTHERN, M.I.E.S.

A Manual of Marine Engineering Practice.

Contains most complete and up-to-date practical information of any work published.
Includes Diesel Oil Engines and Geared Turbines.

'Titanic' Engineers

SOUTHAMPTON MEMORIAL.

UNVEILING CEREMONY, April 22nd, 1914.

PICTURE POST-CARDS
(Real Photographs).

PHOTOGRAPHIC ENLARGEMENTS.

Prices—

Enlargements (mounted), size, 23ins. × 19ins. 8/6
Or ,, 15ins. × 12ins. 7/6
Carriage Paid.
Picture Post-cards, 2d. each.

Apply Publishers:
THE MARINE ENGINEER AND NAVAL ARCHITECT,
3, Amen Corner, London, E.C.

HAWTHORN'S
Marine Engineering and Mathematical Academy (ESTAB. 1888),
41, East India Dock Road, POPLAR, E.
Principal - J. HAWTHORN,
M.I.Mar.E.; Extra Chief Engineer; Memb. Soc. Arts; 1st Medallist in Navigation from Royal Naval Schools, Greenwich.

Engineers entering this School receive a thorough preparation from a practical sea-going Engineer of 15 years' service.

Candidates prepared for 2nd Class, 1st Class and Extra Chief Certificates.

Personal Lectures, accompanied by Diagrams, on the Verbals and Elementaries.

Candidates successfully prepared by Correspondence.

Hours: 9-30 a.m. to 12-30 p.m.; 1-30 p.m. to 5 p.m.

THE CITY (Late LEASK'S)
MARINE ENGINEERING ACADEMY,
4 & 5, HIGH STREET, ALDGATE, LONDON.
Near Fenchurch, Liverpool, and Broad Street Stations and Examination Rooms.

Engineers Thoroughly Prepared for 2nd, 1st and Extra 1st Class Board of Trade Certificates, Engineer Surveyorships, Boiler Inspectors, &c.

Nautical Officers Prepared for Voluntary Examinations in Steam. **Individual Tuition** given to all our students. **Lectures daily,** accompanied by Models, Diagrams, &c., special attention being given to the **New Subjects.**

Our Unique Correspondence System enables students to prepare without leaving their ships or daily employment.

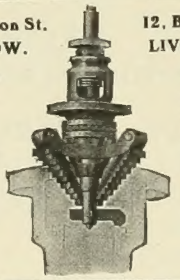
Hours of Study: 10 a.m. to 5 p.m. (Sats. excepted).

Evening Classes—Tuesdays and Thursdays, 6 to 8-15.

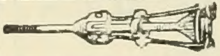
Principal: A. E. BATTLE, M.I.Mar.E., M.R.S.I.
(late H.M. Colonial Government),
Certified Extra 1st Class Engineer.

CARDIFF.
The MARINE ENGINEERS' TRAINING COLLEGE,
VICTORIA CHAMBERS, WORKING ST.
Engineers thoroughly and rapidly prepared for 2nd, 1st, and Extra Examinations.
PRINCIPAL—F. HOVENDEN, Ex. 1st., M.I.Mar.E.
Author of "Practical Mathematics for Engineers."

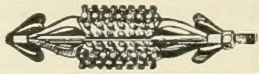
BROMELL PATENTS Co. LTD
62, Robertson St. GLASGOW.
12, Bath Street, LIVERPOOL.



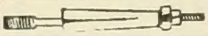
Simplex Valve Reseater.
Strong and Serviceable. Self-centreing.
Attachment supplied for facing valves.
Cutters seen when working.



Simplex Tube Cleaner.



No. 1 Simplex Expanding Brush.



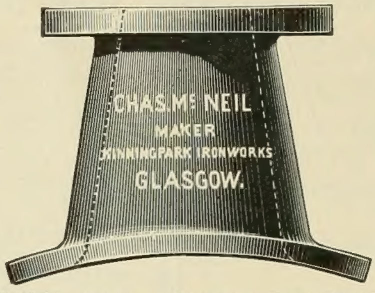
Simplex Condenser Cleaner

No. 2 Simplex Self-Adjusting Tube Brush.

AS USED BY
CUNARD, WHITE STAR, ORIENT, BRITISH INDIA, ALLAN & other Lines

---

Charles McNeil
SPECIALIST IN
HYDRAULIC STAMPINGS AND FORGINGS.
On Admiralty and War Office Lists.
Code: 5th Edition A B C.
Engineering Telegraph Code: 2nd Edition.
Telegrams—McNeil, Glasgow.
Kinning Park Ironworks and Hydraulic Forge, 270, West Scotland St., GLASGOW.



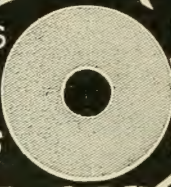
McNeil's Weldless Wrought Steel Stand Pipes are very superior to those which are either cast or welded. Bottom Flanges for single or double riveting and curved to suit diameter of boiler. Safe, strong, durable, and light.

Engineering Books

The Publisher will be pleased to obtain and forward to Subscribers, at home and abroad, any Engineering Book published, on receipt of cash with order.

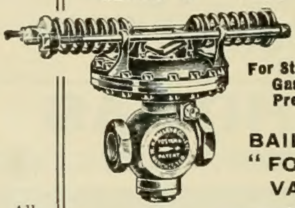
Address: PUBLISHER,
"Marine Engineer and Naval Architect,"
3, Amen Corner, LONDON, E.C.

GENUINE
VULCANIZED FIBRE
SHEETS
TUBES
RODS
STAPLES
VALVES
WASHERS
PACKINGS
SHIELDS



MOSSES & MITCHELL
CHISWELL WORKS
GOLDEN LANE LONDON E C

BAILEY'S PATENT "CLASS W" **"FOSTER" REDUCING VALVE**
For Steam, Water, Gas or Air Pressures.

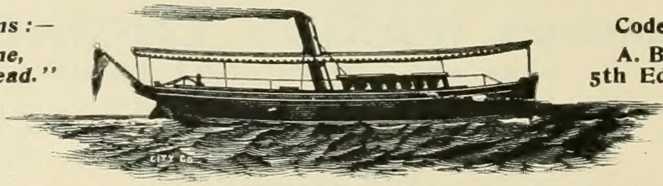


All Sizes ½" to 24"

BAILEY'S "FOSTER" VALVES
1770 are working in hundreds of ships reducing pressures, controlling feed, sanitary pumps, etc. See Special Booklet, No. 210.
Sir W. H. Bailey & Co., Ltd., Salford, Manchester.

A. RUTHERFORD & CO.,
NEPTUNE WORKS, BIRKENHEAD.
Shipbuilders and Repairers, | **Engineers and Boiler Makers.**

Telegrams:— "Neptune, Birkenhead."
Code:— A. B. C 5th Edition.



Builders to the British and Foreign Admiralties and the Royal National Lifeboat Institute.
Every description of Launch, Barge, Lighter, Surf Boat, etc., etc.

KOH-I-NOOR **CHAPLIN'S KOH-I-NOOR (DIAMOND) SELF-LUBRICATING PACKINGS**
Registered Trade Mark.
For STEAM (High or Low Pressure) PUMPS or HYDRAULIC USE.
Will not Cut or Groove the Rods. Lubricant Uninjured by Heat, Water or Acid.
THE MOST EFFECTIVE PACKING IN THE MARKET.
The Original true "DIAMOND" Packing, of which so many inferior imitations have been lately passed off on the public. Brass Trade Mark labels attached to every Coil of Chaplin's genuine Packing.
Prices and Particulars on application.
G. H. CHAPLIN & CO.,
12, St. Helen's Place, Bishopsgate Street, LONDON, E.C.; 25, Chapel Walks, South Castle Street, LIVERPOOL; and at Cail's Buildings, Quayside, NEWCASTLE-on-TYNE.
Telegraphic Address:— **"LUBRIC,** *London."*
Telephones:—London, **9092** *Central. Liverpool,* **4304** *Bank. Newcastle,* **4562** *National.*

INDEX TO ADVERTISERS.

For Classified Index see page vii.

PAGE
Alexander, E. P., & Son ... i
Anderson, D., & Son ... xv
Anglo-Swedish Electric Welding Co., Ltd. viii
Ashwell & Nesbit Limited ...
Aspinall's Patent Governor Co. ... xii
Atlas Metal and Alloys Co., Ltd. ... i
Auld, David, & Sons ... xiii
Bailey, Sir W. H., & Co., Ltd. ... x
Bassett-Lowke, Ltd. ... xiii
Battle, A. E. ... x
Beldam Packing & Rubber Co. ... i & xxviii
Béliard, Crighton & Co. ... xxvi
Bennett College, Sheffield ... xi
Bremner, John A., & Co ... xx
Briggs, W., & Sons, Ltd. ... xxvi
British Arc Welding Co., Ltd ... xxvi
British Oxygen Co., Ltd. ... xxi
British Westinghouse Electric & Mfg. Co., Ltd. ... xvi
Bromell Patents Co., Ltd. ... x
Broughton Copper Co., Ltd. ... i
Brown Bros. & Co., Ltd. ... iv
Brown, James, & Son ... viii
Bruce, R. T., & Co. ... ii
Bull's Metal & Melloid Company, Ltd. ... xiii
Business Dictionaries, Ltd. ... v
Cape Asbestos Co., Ltd. ...
Cedervall, F. R., & Söner ...
Chadburn's (Ship) Telegraph Co., Ltd. ... xxiv
Chaplin, G. H., & Co. ... x
Cochran & Co., Annan, Ltd. ... xx
Cohn, M. B. ... i
Cooper & Co. (Hull) Ltd. ... xxiii
Crane & Co., P. Moir ... i
Day, Summers & Co., Ltd. ... xi
Delta Metal Co., Ltd. ... i
Dermatine Co., Ltd. ... i & xix
Dickinson, W., & Sons ... xxiv
Direct Photo Engraving Co., Ltd. ... vi
Dobbie, McInnes, Ltd. ... vi
Duncan, A., & Co. ... xix
Elmes, A., & Co. ... vi
Evershed & Vignoles ...
Ferguson & Timpson ... xxv
Glasgow Patents Co., Ltd. ... xxvi
Glenfield & Kennedy, Ltd. ... xxv
Graham, Alfred, & Co. ... xii
Green, R. & H., & Silley Weir Ltd. ...
Greene, Tweed & Co. ... ii
Griffin & Co., Ltd., Charles ...
Hawthorn's Engineering Academy ... x
Hayes, Edward ... xxiv
Heath & Co., Ltd. ... xxviii
Howden, James, & Co., Ltd. ... xix
Hudson, John, & Co.'s Successors ...
Jeffery, Alfred, & Co ... xii
Keenan, Matthew, & Co., Ltd. ... xii
Kelvin, Bottomley & Baird, Ltd. ... xvi
Liverpool Patent Co., Ltd. ...
Lockwood & Carlisle, Ltd. ... xxiv
Low, Archibald, & Sons, Ltd. ... xxiii
Marine Engineers' Training College .. x
Marine School of South Shields ... ix
Martin, W. C., & Co., ... xvi
McLean, Hugh, & Son ... vi
McNeil, Chas. ... x
Metallic Valve Co. ... xi
Miscellaneous ... xi
Moseley, D., & Sons, Ltd. ... i
Mosses & Mitchell ... x
North-East Coast Eng. Works (Hull) Ltd. iv
North-Eastern Marine Engin. Co., Ltd. xxiii
Pacific Steam Navigation Co., Ltd. ...
Patents ...
Potts, W. J. ... ix
Ramsay's Marine Engineering Co., Ltd. v
Reed, Thomas, & Co., Ltd. ... ix
Ross, Wm., & Sons ... iii
Ross (Arthur), Hotchkiss & Co., Ltd. ... xv
Royal National Lifeboat Institution .. xxiv
Rutherford, A., & Co. ... x
Schmidt's Superheating Co., Ltd. ... xix
Seaman's Hospital Society ...
Second Northern International Engineering Exhibition ...
Sell, Henry ... v
Sharper & Robinson, Ltd. ... xi
Shipping, Engineering and Machinery Exhibition, Olympia, 1914 ...
Smooth-on Manufacturing Co. ... v
Spencer, W. H., & Co. ... xxiv
Standard Piston Ring and Eng. Co., Ltd. iv
Stewarts and Lloyds, Ltd. ... i
Stone, J., & Co., Ltd. ... vi & xviii
Sturrock Patent Bridge and Engin. Co. ... xii
Superheater Corporation, Ltd. ... xvii
Technical Books ...
Telford, Grier & Mackay ... vi
Thornycroft, John I., & Co., Ltd. ...
Toope's Asbestos Covering Co., Ltd. ...
Trist, Ronald, & Co., Ltd. ... iv
Tuck & Co., Ltd. ... i & xxii
United States Metallic Packing Co., Ltd. ii
Universal Metallic Packing Co., Ltd. .. xiii
Vickers, Benjn. R., & Sons, Ltd. ... iii
Wailes, Dove & Co., Ltd. ... i & xxvii
Walker, James, & Co., Ltd. ... i & xiv
Wallsend Slipway & Engin. Co., Ltd. ... xxix
Warner, Robert, & Co. (Eng.). ... vii
Waygood-Otis, Ltd. ...
Websters, Ltd. ...
Weir, G. & J., Ltd. ... iii
Westinghouse Co. ...
White & Woodington ... i
Wilkes, John, Sons & Mapplebeck, Ltd. i
Woodall & Co. ...
Woodite Company ... i
Yorkshire Copper Works, Ltd. ... iii

Books on Marine Engineering, Naval Architecture and all other subjects; second-hand at half-prices, new 25% discount. Catalogue No. 153, post-free. Books bought —FOYLE, 121, Charing Cross Road, London.

THE
BENNETT COLLEGE, SHEFFIELD

Have Just Published a Little Book,
"WHY YOU SHOULD STUDY MARINE ENGINEERING, and HOW."

It is full of Useful Tables, Formulæ and Information concerning the Exams. for
Second Class, First Class & Extra First.

Every Marine Engineer should possess one.

We shall give away **1000 COPIES FREE.**
Write for one now, and mention this journal.

They are FREE. *NOTE ADDRESS ABOVE*

READY SHORTLY.

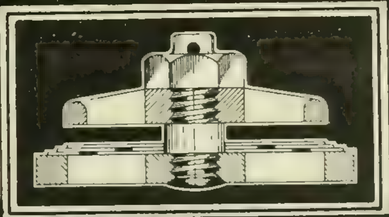
Binding Cases for Volume XXXVI.

Price, Cloth, 1/6 each; post-free, 1/10.
Prices for Special Bindings on application.

BOUND VOLUME XXXVI.

Price, Cloth, 7/6 each; post-free, United Kingdom, Canada and Newfoundland, 8/-; other Countries, 9/-.
Volumes printed on Art Paper 1/6 extra.

Address: PUBLISHING DEPARTMENT,
THE
Marine Engineer & Naval Architect,
3, Amen Corner, LONDON, E.C.



KINGHORN'S PATENT VALVES

THE BEST VALVE FOR PUMPS OF ALL DESCRIPTIONS ADOPTED UNIVERSALLY AND USED BY 15 ADMIRALTIES.

FITTED TO H.M.S. DREADNOUGHT & SISTER SHIPS & TO THE NEW CUNARD WHITE STAR & OTHER LEADING LINERS.

TELEPHONE :- 5818 CENTRAL.
THE METALLIC VALVE Co
COLONIAL HOUSE, WATER STREET,
LIVERPOOL.
TELEGRAMS: "VALVE."

ESTABLISHED 1834.

Day, Summers & Co., Ltd.,

Engineers, Boilermakers, Ship and Yacht Builders,
NORTHAM IRONWORKS, SOUTHAMPTON.

Repairs to vessels and machinery undertaken with despatch.

Branch Workshop at Docks which occupies central situation close to Dry Docks.

Telegraphic Address: "Day Summers, Southampton."
Telephone No. 48.
Dock Shop Telephone, No. 201.

DEALERS IN SHIPS' STORES.
SHIP CHANDLERS.

SHARPER & ROBINSON, Ltd.
(Managing Director, Wm. E. Robinson)

VICTORIA TERRACE,
WEST HARTLEPOOL.

WE ARE EXHIBITING AT THE SHIPPING, ENGINEERING & MACHINERY EXHIBITION, OLYMPIA, SEPT. 25th to OCT. 17th, 1914.

KEENAN'S PATENT NON-CONDUCTING **COMPOSITION.**

The BEST Covering for High-pressure & Super-heated Steam.

KNOWN AND USED ALL OVER THE WORLD.

H.M.S. "FALMOUTH."
All Steam and Exhaust Pipes covered by
Matthew Keenan & Co., Ltd.

Gold Medal, Naval Exhibition, London, 1905.

We are Makers of ALL KINDS OF COVERINGS for Boilers, Steam Pipes, Refrigerating Plants, &c.

ON ADMIRALTY LIST.
CONTRACTORS TO THE WAR OFFICE.

H.M. Office of Works, India Office, Metropolitan Water Board and Asylums Board, London County Council;
The principal Shipowners, Shipbuilders, Railways, Engineers, and Electric Light Co.'s, &c.

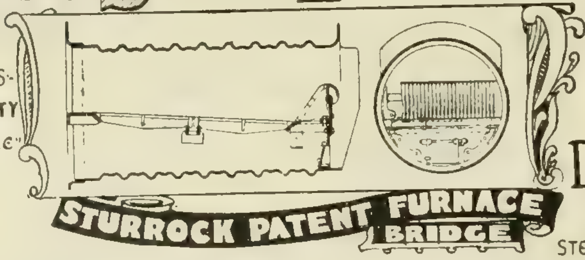
MATTHEW KEENAN & Co., Ltd.,
Established 1858.

TREDEGAR ROAD, BOW, LONDON, E.; and 80, GT. WELLINGTON STREET, GLASGOW.

Telegrams—"Keenanite," London. Telephone—3485, East.
Telegrams—"Keenanite," Glasgow. Telephone—2063, South.

THE STURROCK PATENT BRIDGE AND ENGINEERING Co

Telegrams— "DURABILITY DUNDEE"



41, Reform St
DUNDEE.

IN USE IN THE FOREMOST STEAMSHIP LINES OF THE DAY

ITS SPECIAL ADVANTAGES ARE
1. Facility in moving and replacing Bridges
2. Cleaning Fires, No Clinker adheres to it
3. Better combustion, economy in fuel; emission of black smoke reduced
4. Durability; will last for Years.

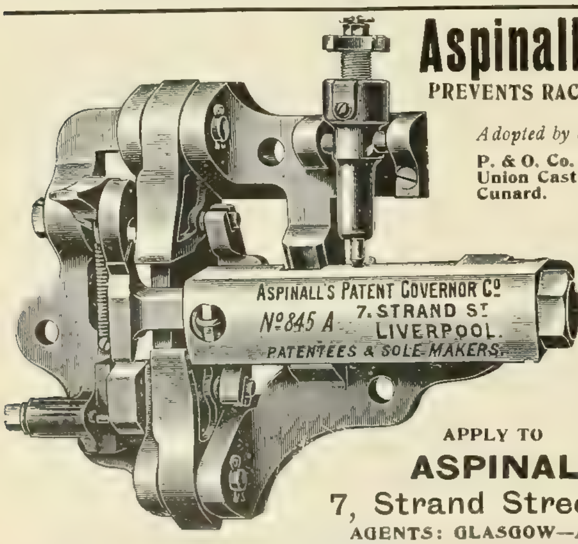
ALFRED GRAHAM & Co.'s
Patent LOUD-SPEAKING NAVAL TELEPHONES

For Battleships, Cruisers, Destroyers, Liners and Mercantile Vessels. *Adopted by the British Admiralty, Foreign Governments, and leading Steamship Lines.*

ST. ANDREW'S WORKS, CROFTON PARK, LONDON, S.E.

MARINE GLUE JEFFERY'S PATENT.

For deck seams of all classes of Steamers, Ships and Yachts, Black and Light-coloured. Cleanly, elastic and insoluble. Invaluable for passenger decks. Used also for waterproof skins of diagonally-built boats, air-tight cases, &c. **Insulating.** Used by Electricians for sundry purposes. Apply, ALFRED JEFFERY & Co., Marsh Gate Lane, Stratford, London, E.
Tel.: "Marine Glue, London." Telephone: 357, Stratford.



Aspinall's Patent "Marine" Engine Governor

PREVENTS RACING and BROKEN SHAFTS. Fitted to all the Largest Steamers afloat.

Adopted by all the Leading Shipping Lines, including—

P. & O. Co.
Union Castle.
Cunard.
White Star.
Pacific S.N.
Hamburg-American.
North German Lloyd.
Compagnie Generale Transatlantique.
Austrian Lloyd
Compagnie Generale Italiana.
Etc., etc.

Fitted to ove 2,500 Moden Steamers.

Including Cunard Turbine Liners
"MAURETANIA" & "LUSITANIA,"

The White Star Liner **"OLYMPIC,"** And the ocean-going Motor Vessel **"SELANDIA."**

Simplest, Cheapest, Most Efficient Marine Governor.

APPLY TO
ASPINALL'S PATENT GOVERNOR CO.,
7, Strand Street, LIVERPOOL. *Telegrams*—"Velo, Liverpool."
AGENTS: GLASGOW—A. BROWN & Co., 233, St. Vincent St.; NEWCASTLE—H. M. WILSON, Baltic Chambers, Quayside; LONDON & SOUTH COAST—F. E. SHEPPARD, 6, Billiter St., London, E.C.

CONTENTS.

	Page
Editorial Notes—	
Conditions of Service in the Mercantile Marine	1
The Channel Tunnel	1
Lloyd's Shipbuilding Returns	2
The Fleets of the Mail Lines	3
Naval Matters—Past and Prospective	5
Marine Motor Notes	6
Institute of Marine Engineers	7
Rubber Exhibition	7
Royal Sanitary Congress	8
The Hamburg-American Co.'s "Vaterland" (*Illustrated*)	8
Mr. Andrew Cochrane (*Illustrated*)	10
Mr Hugh M. Macmillan	10
Welin Davits	10
The Cunard Company's Liner "Aquitania" (*Illustrated*)	11
Reviews	18
Industrial and Trade Notes	19
Launches and Trial Trips	25
Abridgments of New Patents (*Illustrated*)	31
Board of Trade Examinations	31

REMITTANCES.—*All payments for advertisements and subscriptions are to be remitted to the Office, 3, Amen Corner, Paternoster Row, London, E.C., and Cheques and P.O. Orders made payable to the New Marine Engineer Limited, and crossed London City & Midland Bank, Ltd., Newgate Street Branch. No receipts will be recognised unless upon the Company's official forms. Telephone, 5940 CITY. Inland Telegrams, "TECMARINE, CENT LONDON." Foreign Telegrams, "TECMARINE, LONDON."*

ADVERTISEMENTS.—*All Advertisements and Business Communications must be addressed to the MANAGER, 3, Amen Corner, Paternoster Row, London, E.C. Advertisements must be sent in not later than the 20th of each month to ensure insertion in the following number. All Advertisements subject to the approval of the Advertisement Manager.*

The charge for Situations, Vacant and Wanted, Sales and Wants and Miscellaneous Advertisements is 3/6 for four lines and under, over four lines charged at 9d. per line. Official Announcements 1/- per line, minimum 4/-. Small advertisements to be prepaid. When an advertisement measures an inch, or more, scale rate of 7/- per inch charged. Displayed Advertisement rates on application. The page is divided into three columns, each column 2⅛ inches wide by 9 inches in depth.

SUBSCRIPTIONS.—*Great Britain, Colonies, and Foreign Countries, 7/6 (seven shillings and sixpence per annum, including postage). May commence at any date. Volume contains twelve monthly parts, August to July.*

NOTICE.—*All Contributions and Books for Review should be addressed to the EDITOR, R. W. JAMES, A.M.I.C.E., M.I.M.E., 3, Amen Corner, Paternoster Row, London, E.C. All communications must be accompanied by the name of the sender, not necessarily for publication, but as a guarantee of good faith. The return of rejected communications cannot be guaranteed, nor will the Editor be answerable for the loss of any MSS. CORRESPONDENCE and PHOTOGRAPHS on Shipbuilding, Marine Engineering and allied subjects invited.*

Bull's Metal & Melloid Co. Ltd.

Offices and Works: YOKER, near GLASGOW.

Telegrams:—"Melloid, Yoker." Nat. Tel.:—No. 182 Clydebank.

BULL'S METAL.—Propellers, Bars, Sheets, Pump Rods, Valve Spindles, Condenser Stays and Plates, etc.

MELLOID (Reg. Trade Mark and Patented).—Condenser Tubes, Plates and Stays, Boiler Tubes, Stays and Plates, Fire-box Plates, Bars, Sheets, Valves, etc.

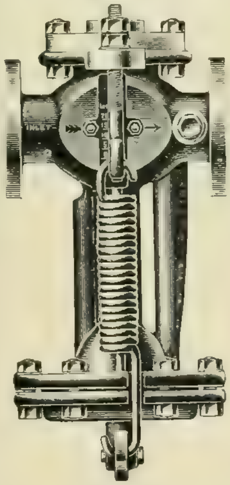
WHITE METALS.—Rabbit's, Plastic, etc. "Tempalto" for Metallic Packing Rings to resist the temperature of superheated steam.

Bull's Metal Propellers

Replacing Cast Iron, will effect an average increase in speed (on the same coal consumption) of

ABOUT ½ KNOT.

ASK FOR COPIES OF REPORTS AND TESTIMONIALS.



AULD'S QUITETITE REDUCING VALVE.

Simple Construction. Great Controlling Power. Shuts off dead tight when no steam is being used. Extremely accurate regulation of reduced pressure.

ABSOLUTELY RELIABLE for LAND and MARINE USE.

LISTS ON APPLICATION.

STEAM REDUCING VALVES

— AND —

SURPLUS STEAM VALVES

Also Reducing Valves for Air, Water and Gas.

Telegrams:—
"REDUCING, GLASGOW."

DAVID AULD & SONS, Ltd.
Whitevale Foundry, GLASGOW.

BASSETT-LOWKE, Ltd., MODEL SHIPBUILDERS,

112, HIGH HOLBORN, LONDON, W.C.

We possess the most perfect ***Model Boat Building Works*** in the Kingdom, for the rapid and accurate execution of every description of Ship Modelling.

We issue a comprehensive and fully illustrated list, dealing entirely with our productions. Post-free on receipt of 3d. **Write for List No. S71.**

BASSETT-LOWKE, Ltd. **Works: NORTHAMPTON, ENGLAND**

UNIVERSAL

A 1 PACKING

SPECIALLY ADAPTED FOR MARINE ENGINES

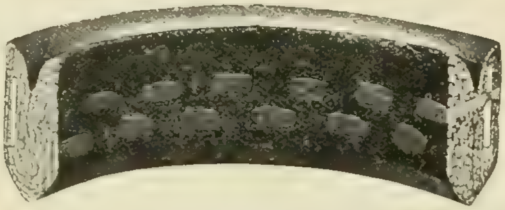
RENOWNED FOR EFFICIENCY & DURABILITY.

**THE UNIVERSAL METALLIC
PACKING CO., LTD.,
LIDGET GREEN, BRADFORD, ENGLAND.**

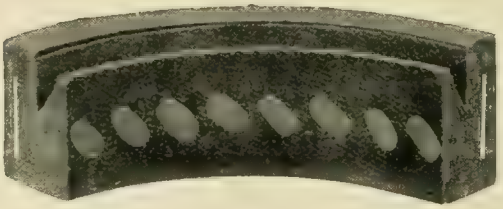
Telephone No. 2939 Bradford. Telegrams: "Universal, Bradford."

WALKER'S LION PACKING
TRADE MARK

Two "LIONS"
That Guard Against
Packing Trouble



" Lion " Expanding Steam Packing
for difficult jobs.



" Lion " Automatic Water Packing
for hydraulic and pump work.

Walker's LION | **Expanding Steam Packing**
Automatic Water Packing

Walker's "Lion" Packing expands and contracts automatically with varying pressures of steam and water. It never loses its "spring" and therefore eliminates all packing troubles and expense.

"Lion" Packing presents a complete metallic wearing surface which prevents scoring, reduces friction to a minimum, and gives added life to both the rod and the packing.

A **"Thin Red Line,"** which is fully protected by Copyright, now runs through all Genuine "Lion" (Patent) Metallic Packings. Also Brass Trade-Mark Labels and Seal are attached, without which none are genuine.

BEWARE OF IMITATIONS.

Send for Latest Illustrated Catalogue to the Sole Manufacturers and Patentees—

JAMES WALKER & CO., LTD.,

LION WORKS, GARFORD ST., WEST INDIA DOCKS,
LONDON, E.

Telegrams: "Lioncelle Pop, London." Telephone: East 3084.

The Marine Engineer

And Naval Architect.

LONDON, AUGUST, 1914.

CONDITIONS OF SERVICE IN THE MERCANTILE MARINE.

A CERTAIN amount of criticism has been levelled at the Board of Trade in recent years as to its attitude towards the officers and crews serving in the mercantile marine. Having given full publicity to this criticism, it is only fair and reasonable that we present the other side of the picture, as represented by the official side. In doing this, we take the comprehensive and spirited reply of Mr. John Burns, the President of the Board of Trade, on a motion for the reduction of his salary, as giving the official view. In dealing with the subject of vision test, about which so much has been said in the past to the effect that the sight test adopted by the Board of Trade was unfair to the officers and needlessly stringent, the Board, to meet the point, adopted the very practical course of submitting the question at issue to persons representing the two sections of opinion, for a series of thorough tests, with the result, that the critics agreed that the Board of Trade sight tests under the material conditions came out of the demonstration with flying colours. Dealing with the question of policy, the President pointed out that the Board did not want to be severe on the seaman; on the contrary, he properly evokes the sympathy of everybody by virtue of the peculiar nature of the seaman's calling; nor does the Board want to be unjust to the officers, because it is not the business of any Department to have such an absurdly high standard of examination as to prevent men coming into a particular service, such as the mercantile marine. However, the Board have a duty towards the public and towards the officers and men themselves, and have a right to say that where a man cannot comply with a reasonably fair and just test, such as now operates, his place is not on the deck of a steamer or sailing vessel. His place should be where his defective vision, if put to the test, would not be a danger to the community. Dealing with the question of health on shipboard, while the death rate from disease for the past eight years, of men and boys in the navy, army and the civil population, of similar ages, had shown a tremendous and gratifying decline, that relative to the mercantile marine had been practically stationary for the past twenty years. The President pointed out that the question naturally arises as to whether we are drawing from a poorer class of population for the mercantile marine, as compared to that from which we were drawing many years ago. If this is so, then the vocation should be made more attractive, and the President made a strong appeal to owners of ships, holders of shares in ships and leaders of every branch of shipping business to do everything in their power, either by voluntary, personal or business effort, to bring the health and the hygienic and sanitary conditions of sailors on board ship, so far as their accommodation, food and treatment are concerned, up to that of other sections of the population. We agree, as will all right-thinking people, that if there is one branch of the social, industrial and commercial life of this nation in which wages ought to be good, food excellent and sanitary conditions of the highest possible standard, it is that of the mercantile marine, upon which the country has to rely so much for its prosperity. In furtherance of this object a small committee has been set up by the Board, comprising specialists, medical officers, statistical experts and others, to consider and report upon the high death rate among the sea-faring class. In reference to this subject the President dealt with a subject ancillary thereto, *viz.*, the provision of hospitals on cargo steamers. In 1902, of 150 large vessels built, only ten or 7% were provided with crew hospitals, in 1912, 160 were built, twenty-eight or 17% were so provided, and in 1913, 213 were built, sixty-eight or 32% were so provided. All this is quite in the right direction, as it is quite conceivable such accommodation is even more needed than on great liners. It will be recognised that Mr. Burns is not only widely sympathetic and broad in his views, but has got the ability to range matters in their proper proportion and inaugurate steps to bring about a practical result of benefit to those whose calling deserves full consideration to the necessities of comfort of occupation, within reasonable limits.

THE CHANNEL TUNNEL.

IN previous issues we have dealt with some of the aspects of the Channel Tunnel scheme, and we think our readers will be interested in the views expressed by Lord Sydenham of Combe, with reference to the military considerations involved, at a meeting convened by the House of Commons Channel Tunnel Committee last month. It will be remembered that at a previous meeting the engineering side of the question had been dealt with by Sir Francis Fox, and it was proved to the satisfaction of those then present that the engineering difficulties could easily be overcome by modern science. It may be said that the main subject can be divided into three distinct sections, the engineering, the economic and the military. Lord Sydenham, in dealing with the last section, has in our opinion special qualifications for the purpose, owing to his varied career in the Royal Engineers, his occupation of high posts both at home and abroad under various governments, and as Secretary of the Committee of Imperial Defence under three Prime Ministers. The military fears have largely centred round the late Lord Wolseley's statement that "the seizing of the Tunnel by a *coup de main* is in my opinion a very simple operation, if it be done without any previous warning or intimation whatever. . . . My contention is that, were a tunnel made, England as a nation could be destroyed without any warning whatever, when Europe was in a condition of profound peace." He took care, however, to explain that "the whole plan is based upon the assumption of its being carried out during a time of profound peace between the two nations, France and England, and whilst we were enjoying life in the security and unsuspicion of a fool's paradise." In connection with this view it is well to bear in mind that in giving evidence before a Select Committee of both Houses of Parliament, Lord Wolseley stated his opinion that fifty men at the entrance of the tunnel could prevent an army of 100,000 men coming through. Lord Sydenham points out that in modern conditions mobilizations are very swiftly carried out, and that hostilities may be begun far more rapidly than was formerly possible. On the other hand the amazing development of means of communication has at the same time made it far more difficult to take any military steps without the knowledge of something unusual becoming known, in fact, the danger of to-day is not that we shall get no warning, but that rumours may be spread without foundation. If, as Lord Sydenham says, it is possible to reject Lord Wolseley's theory that a blow can be struck at a time of profound peace without the least warning or intimation, the subject of the tunnel can be approached in a fresh spirit. In support of this rejection it may be mentioned that in Lord Lansdowne's Draft Report at the time the following significant statement occurs: "We do not take the view that the contingency of a *coup de main* struck by a power with whom our relations had been friendly and unstrained is one which we have any right or which our experience would justify us in placing among the foremost of the probabilities with which we have to deal. It is our impression, on the contrary, that if such an attack were to be made it would have been preceded by circumstances which would have called for effectual precautions against a surprise." Lord Sydenham then dealt at length with the question of protecting the tunnel as a means of invasion. There would be at least two strong forts and an electric generating station, probably situated miles inland, to deal with and probably a part of the railway on a viaduct visible from the sea and within range of naval guns afloat. Success could only be achieved by the simultaneous captures of the two forts and generating station, which seems impossible unless done without any warning, which in itself is most improbable. And if this can be done the operation of the trains must be undisturbed for some time to enable any large body of troops to enter the country by the Tunnel. The measures of precaution which appear to Lord Sydenham to meet every reasonable contingency are: Means of holding up every train for examination; means of flooding a dip in the tunnel actuated from each of two independent forts; the forts to command the exit from the tunnel with guns that cannot be silenced from the sea, and the exposure of a portion of the line to gun-fire from the sea. We agree that the precautions suggested appear to fully answer the critics of the military aspect of the question, but there is still the economic side of the question to be carefully considered before a sound final judgment can be expressed on the proposal.

WIRELESS DIRECTION FINDER.—The Marconi-Bellini-Tosi apparatus which has been installed on the Canadian Northern R.M.S. *Royal George*, has proved in every way satisfactory. The apparatus enables a vessel, even in the thickest weather, and without the aid of compass or sextant to find her position when she is within a radius of about 50 miles of a fixed wireless station or one on board a ship whose position is known. Moreover, should a vessel pick up a wireless distress signal on this apparatus, she would be able to set her course towards its source, even though the ship in distress has not been able to give her position.

LLOYD'S SHIPBUILDING RETURNS.

The Returns compiled by LLOYD'S REGISTER OF SHIPPING, which only take into account vessels of 100 tons and upwards, the construction of which has actually begun, show that, excluding warships, there were 477 vessels of 1,722,124 tons gross under construction in the United Kingdom at the close of the quarter ended 30th June, 1914. The particulars of the vessels in question are as follows, similar details being given for the last quarter and for the 30th June, 1913, for the purpose of comparison:—

Description.	30th June, 1914.		31st March, 1914.		30th June, 1913.	
	No.	Gr. Tonn.	No.	Gr. Tonn.	No.	Gr. Tonn.
STEAM.						
Steel	463	1,717,747	497	1,884,735	514	1,995,754
Iron..	..	..	..	..	..	..
Wood and Comp.	..	..	6	211	5	270
Total ..	463	1,717,747	503	1,884,946	519	1,996,024
SAIL.						
Steel	13	4,277	18	5,440	17	7,095
Iron..	..	..	1	270	..	..
Wood and Comp.	1	100	13	200	7	122
Total ..	14	4,377	32	5,910	24	7,217
Total Steam & Sail	477	1,722,124	535	1,890,856	543	2,003,241

1,243,936 tons of the total under construction in Great Britain at 30th June, 1914, is intended for the United Kingdom.

The tonnage building abroad, *viz.*:—1,440,766 tons, comprised in 459 vessels, is within 12,000 tons of the highest ever recorded (March, 1914), and added to the amount under construction in the United Kingdom shows a grand total for the World of 3,162,890 tons; these figures are nearly 284,000 tons below the World's Record reached in June, 1913.

Of warships, 74 vessels of 440,400 displacement tons were under construction in Great Britain, 14 vessels at Royal dockyards and 60 at private yards. In addition, 16 vessels of 152,145 displacement tons were under construction at British private yards for foreign governments. 495 merchant vessels of 1,865,337 tons are being built under the supervision of Lloyd's Register.

THE motor ship *Arum* has had two Cochran (Annan) donkey boilers fitted for generating steam for the deck and auxiliary machinery. They are worked under natural draught and arranged to be heated either by coal, oil or by exhaust gases from the main engines.

WE have again been asked to call the attention of our readers to the inducements offered to engineers who join the service of the Royal Indian Marine and to point out that two appointments are now open for application. Applicants must have Board of Trade certificates, not necessarily first-class and should apply for forms and full particulars to the Director of the Royal Indian Marine, India Office, Whitehall, London, S.W.

AN official report has just been issued by the Board of Trade giving the number of marine engineers' certificates issued. For the year 1913 there were 2,307 certificates issued, of which 1,351 were second, 927 first and twenty-nine extra first-class. In 1912 the total was 2,336, made up of 1,270 second, 1,033 first and thirty-three extra first. For 1911 the figures were 2,121, or 1,111 second, 982 first and twenty-eight extra first.

THE LARGEST BRITISH LINER.—Certain inaccuracies inadvertently appeared in the figures given in the comparative statement published in our July issue with respect to the leading dimensions of the largest Atlantic liners. The *Olympic*, of the White Star Line, has a gross tonnage of 46,359, with a load displacement of 52,310 tons, and her service speed is about 23 knots. The gross tonnage of the *Aquitania* is 45,647 and her displacement 51,700 tons. We publish these correct details, which will no doubt be of interest to our readers, particularly as the tonnage is the basis of the White Star Line's claim that their vessel is the largest British steamer.

THE FLEETS OF THE MAIL LINES.

(From our own Correspondent.)

The Judgment in the Empress of Ireland Enquiry will not surprise those who have followed with attention the progress of the case. The allegations of the witness Galway, who is stated to have made complaints as to the ship's erratic steering were not borne out, nor did the evidence of the witnesses from the steam collier *Alden* lend Galway's assertions any corroboration. For all these people could say did not appear to amount to more than a suggestion that the mail steamer was yawing as she went down the river. Now it would have wanted something more than a yaw to have brought about the collision, if the positions of the two ships when they first sighted one another be accepted, and their courses laid therefrom.

The witness Tuftenaes, indeed, under the skilful cross examination of Mr. Butler Aspinall, told the whole story. When they first saw one another they were clearly on opposite courses, which, if continued, would have taken them safely past one another starboard to starboard. For some unexplained reason Tuftenaes, who was in charge of the *Storstad* at the time, felt it desirable to port his helm. Perhaps he wanted to get into a position to pass port to port. But whatever may have been the reason which caused him to do what he did, the fact remains that he did it, and that it was followed by the awful consequences which have thrown two continents into mourning. Moreover he was guilty of another default in that he neglected to obey orders and did not call Captain Anderson when the fog came down. So the *Storstad* was found alone to blame.

When the first accounts of the disaster came to hand it was said that the bows of the collier ripped the plates from the frames of the mail steamer from amidships, where the great blow was struck, right aft to the starboard propellor. The evidence at the enquiry shows that this was not in truth the case. The wound was amidships and involved the two largest compartments only. But that was enough. It has been calculated, for the purposes of the enquiry, that the opening admitted the sea at the rate of 263 tons per second. That would, of course, be enough to fill up both compartments well under a minute. But with two compartments full the ship should still, according to her design, have floated, even in a rough sea. She took her list and sank, not because of the external wounds in the final event, but because the bulkhead doors, not having been closed, the water extended through the lower part of the ship. She would, of course in that case soon be brought down so that open portholes would lend their aid in filling and then, as she further listed, great streams would flow down over the tops of the bulkheads. Under these circumstances it seems strange, not that there should have been so great loss of life, but, on the contrary, that so many persons should have escaped, for there was little time indeed to get to the upper decks or to make use of the life-saving appliances provided in such large quantities. Lord Mersey's commission hit on the lesson of the disaster when they recommended that in the future all bulkhead-doors and all portholes should be closed at night and when fog comes on. It seems likely that those large passenger vessels which have not adopted one or other of the existing systems for door-closing will soon be fitted with such appliances as have been so clearly proved to be essential. Another matter which the Commission rightly impressed on the public was the fact that the lamentable loss of the *Empress of Ireland* is in no way a case to be cited in support of the alleged "dangers of the St. Lawrence." Where the collision took place the waters are as wide as the Straits of Dover, and indeed the accident might just as well have occurred in the estuary of the Thames or of the Mersey. But do what men will the human element will remain fallible and mistakes will occur. However, it must be guarded against, that it shall not be possible for a passenger vessel with over a thousand hapless human beings on board, to founder in a few minutes within a short distance of shore under conditions which make the resort to the great mass of life-saving appliances which she has on board practically impossible. Providing bulkhead doors actuated from the bridge is one thing, but double skins, or at least side bunkers, are also essential. The piercing of an inch plate ought not, however large the hole, to admit the sea directly into the largest compartments, and those which contain the vitals of the ship. Lord Mersey's other suggestion that to lessen the chances of collision separate pilot stations for inward and outward-bound vessels should be provided—has it appears already been acted upon by the Canadian Government.

The Oceanic.

So much is said of the great ships which have recently been placed on the New York Station that people tend perhaps to pass by the advantages of their old friends. Arrangements have now been made by those Southampton Companies whose vessels call at Cherbourg, to take passengers to and from the French port. The charge is of course somewhat higher than that ruling on the channel steamers of The South Western Railway, but whereas in the little boat one gets a passage, in the larger vessel one has an enjoyable, if all too short holiday, and sees something of life at sea. Those who take this trip will find that Cherbourg is a town of many interests, quite apart from the naval and military aspects which may not be open to the casual traveller. Strange to say, as yet it is almost untouched by the British tourist, although it lies so near our own shores. Moreover the country round is beautiful beyond words. Being in Paris on business I took the opportunity to return *via* Cherbourg and to cross in the *Oceanic*. The arrangements were perfect. A large and well-appointed twin-screw tender, specially designed for the service and looking capable of going anywhere and doing anything lay at the quay, and at the right moment moved off into the bay. As she proceeded to the entrance of the harbour the *Oceanic* was seen outside the breakwater coming up at speed. Our engines were slowed and hardly had the way run off when the big yacht passed us and stopped. A few minutes later we were alongside and going up the gangway. All was so admirably timed that we escaped any risk of lying pitching and rolling in the seaway whilst we waited for a distant liner. A number of Continental-bound passengers use the port and a good many people and much baggage was rapidly transferred. Then the tender was off to the quay where the passengers would find a special train for Paris awaiting them, and the *Oceanic* with her remaining complement, still a goodly number, turned her nose for Spithead. One had no time to see a tithe of the luxuries and comforts of the public rooms and the attractions of the decks before the bugle sounded for lunch. The meal was served in the handsome oak and gold saloon where solid workmanship and good material are apparent throughout. Whilst lightness and effect are achieved by the great glass screen with its brass pillars at the after end of the room, the enquiring eye may notice the unobtrusive bulkhead doors with their controlling rods—ready at the instant when the master-mind of the ship wills it, to back up the glass with watertight steel. And the catering, china and glass, were such as one only gets in a hotel where one is a visitor and not a mere number—and food, hot from the galley, well chosen and perfectly cooked. Above all a steward who serves with apparent interest. An hour or two's laze on deck watching the constant interests of the Channel and we were at Spithead, and all too soon found ourselves in Southampton Docks. The baggage arrangements are perfect—as indeed they should be with all the experience that ship-owner, customs officer, and dock manager have accumulated. But the special for Waterloo did not start nearly as soon as the passengers were ready for it, and their baggage was aboard. The Company, however, tried to make up for this delay in starting by giving us a fine run through the lovely scenery of Hampshire and Surrey. Travelling is indeed a luxury now-a-days, but I doubt if the full measure of pleasure is to be found in the fashionable monsters of the moment.

The P. & O. Company.

As time goes on evidence accumulates as to the extent to which the arrangement between the P. & O. and British India Companies will go. It is now announced that on the 1st October, the British India Company will transfer its headquarters from its present offices to a new building which P. & O. has completed in connection with its own historic mansion in Leadenhall Street. This gives evidence of a nearer approach than was perhaps first indicated. Meanwhile the P. & O. is not allowing its fleet to become antiquated. Hardly had the announcement been made that the new *Kaisar I Hind* was safely put into the water than we were told that orders have been placed for two more 15,000-ton mail steamships. They are to be fitted with twin screws and quadruple-expansion reciprocating engines. One point of interest about the announcement is the fact that one of them is to be built by Messrs. Caird, of Greenock, who are perhaps the most regular contractors to P. & O., and the other is to be constructed at the Queen's Island yard by Messrs. Harland & Wolff, who, of course, built, amongst other vessels for this fleet, a pair of the famous Jubilee sisters—the *Oceana* and the *Arcadia*—in 1887 and a couple of the earlier ships of the "M" class.

Though the present contract for the conveyance of the India mails does not terminate till the end of January, 1917, it is said that a re-arrangement which will give India a bi-weekly, instead of a weekly service as at present, is under contemplation. It is added that if such re-arrangement takes place the port of Brindisi may be forsaken.

Salvage.

The difficulties of shipowners and underwriters in regard to salvage plant has been strikingly apparent in reference to recent accidents. Nothing that made a heavy call upon the steamships of the Liverpool Underwriters' Association has occurred of late, and their two ships *Ranger* and *Linnet* were unoccupied when the news came of the stranding of the important Red Star liner *Gothland* at the Bishop's. The vessels accordingly proceeded to the spot, and had the good fortune to successfully accomplish a difficult and at one time doubtful task, safely beaching the *Gothland* at St. Mary's, where they were able to patch her up sufficiently to enable her to proceed with assistance to Southampton. But whilst she was on the ground she needed all the attention and care of both vessels. This being so the homeward-bound Anchor liner *California* goes ashore on the rocky coast of Tory Island. Assistance was urgently needed for her. But the *Ranger* and the *Linnet* could not be spared. The Glasgow Salvage Association sent its appliances to Tory Island, but circumstances were in many respects unfavourable, and on the 7th July new arrangements were made. The Swedish firm of Svitzer undertook to send their steamships *Em. Z. Svitzer* from Dartmouth and *Viking* from Copenhagen, with a view to a possible contract. A careful examination of the condition and prospects of the wreck was made by the proposed foreign salvors, and on the basis of what they saw they made an offer to do the work. But their terms were not acceptable to the underwriters, and on the 14th July it was arranged that the *Linnet*, which had by this time finished her work with the *Gothland*, should be sent to Tory Island. It will be seen from what we have said, that some fourteen days or so had gone by before the Liverpool Underwriters were able to get a chance of putting their best appliances on to the work of refloating the steamer, and in salvage work above all things it must be admitted that "delays are dangerous." Yet though that be admitted, the underwriters, who may be taken to know their own business, find that it is more to their interests to run the chance of, once in a while, leaving a valuable steamer without prompt aid, than it would be to at all times carry an increased fleet of salvage vessels fully manned and stored, waiting for the work which it is hoped may never come—for salvages are costly things, even when successful. An idea of the importance attached to prompt lightening in such a case as this of the *California* may be gathered from the fact that, trans-shipment being for the moment out of the question, some fifteen motor cars in cases are said to have been jettisoned from her cargo.

The Advantages of Amalgamation

may be seen by reference to the recently issued report of the Furness, Withy Company for the year ending on the 30th April. The Company shows a balance to the credit of profit and loss of no less than £621,000. This is indeed a reduction of £130,000 on the corresponding figure for the previous twelve months. But some contraction is only to be expected in view of the falling off in the rate of freights, and the proportions are certainly more favourable than those of other shipping businesses whose pre-occupations are less varied and widespread. For, in spite of everything, the directors are able to continue the ten per cent. dividend and to carry the same amount—£350,000—to the depreciation fund as they did in 1913, the year of great prosperity.

This being so it would seem likely that a large measure of success will attend the forthcoming flotation of the new company, the Furness-Houlder Argentine Lines, Ltd., which has just been registered with a capital of a million sterling. Its possibilities are wide, for power is taken, amongst other things, to enter into agreements with Messrs. Furness Withy & Co. and with five shipbuilding companies, *viz*., Messrs. Raylton Dixon & Co., Earle's Shipbuilding and Engineering Co., Messrs. Alexander Stephen & Co., Messrs. Palmers, of Newcastle, and Irvine's Shipbuilding and Dry Docks Co. It would appear, therefore, that here is an instance of yet another step towards the mutual interworking of shipbuilder and shipowner to the intended profit of all concerned. It is, however, announced that its first business will be the inaugurating of a new line of refrigerated steamers from the Argentine to Europe.

The International Mercantile Marine Company

now formally announces that on the opening of the Panama Canal it will inaugurate, with its large twin-screw liners *Finland* and *Kroonland*, a new service between San Francisco and New York. Sailings are to be made at three-weekly intervals and the voyage, with calls at Los Angeles and San Diego, is expected to occupy some sixteen days.

THE s.s. *Graziella*, launched by Messrs. Osbourne, Graham and Co., has been fitted with a Cochran (Annan) donkey boiler with patent seamless furnace.

CAPTAIN JAMES L. PARFITT, for over fifty years in the service of the P. & O. Company, and latterly their marine superintendent, died on July 5th at the age of sixty-four. The deceased gentleman had been actively engaged at his work until a few weeks before his death. He was buried on the 8th July at Norwood Cemetery.

THE strong comments made towards to close of the Royal Sanitary Congress, on the subject of the accommodation and treatment of seamen, including the engine room crew, has a bearing on the quality of the *personnel*, and doubtless if the accommodation and treatment were improved, the whole class would be improved. This is a matter which might fittingly occupy the attention of the advisory committee of the Board of Trade. The representatives of the marine engineers and of the seamen who have presumably had extensive sea-going experience, will be able to speak in Committee from their personal knowledge of the forecastle and its general condition. There is no doubt that there is very great room for improvement, and the scathing critisism referred to may be admitted as deserved; this the committee can readily investigate.

THE ROYAL AGRICULTURAL SHOW was held at Shrewsbury in the early days of July and was of interest from an engineering point of view in respect to the appliances which were exhibited and these held our admiring attention on the occasion of our visit. The exhibits in question were under the names of firms well known to engineers and embraced machinery, from motive power plant to the mechanical milkers, these latter being described in detail by an operator. Australasia was well represented, and within each of the enclosures were exhibited excellent samples of the produce and fruit exported from the oversea dominions. These at the same time illustrated the efficiency of the refrigerating systems and the care and attention given by the engineers in charge of the machinery to the various consignments, with the best temperature adjustments for their preservation—a silent golden tribute to the practical service rendered to the empire by the marine engineer, and while silence may be golden, it was none the less pleasing while *en route* from Shrewsbury, to hear the silvern speech giving expression to the testimony that the marine Engineer deserved well of his country and received very scant recognition. Specimens of work done at several of the technical schools were shown and samples from their laboratories and museums to indicate the enemies of the farmer—pests and results of their ravages, etc. all serving to illustrate that those of the rising generation who elect to become agriculturalists, now have good opportunities of gaining knowledge and scientific training to better equip them for their employment. Similar schools for the training of youths to serve as firemen might be established with advantage in more than one direction. The royal visit was paid to the show on July 3rd, the week prior to the visit to the Clyde Shipbuilding yards.

NAVAL MATTERS—PAST AND PROSPECTIVE.

(*From our own Correspondents.*)

Portsmouth Dockyard.

THE gathering of the squadrons at Spithead, the mobilization of the Third Fleet with some 15,000 seamen and marines from the reserves, the presence of a record number of seaplanes, aeroplanes and airships, and the visit of King George to inspect this vast armada, together constitute the outstanding event of the year so far as Portsmouth Dockyard is concerned. It speaks volumes for the capacity and powers of organization of the naval officer that the detailed and intricate programme for the gathering at Spithead, for the week-end from July 18th to 20th, should have been carried out so successfully and without serious mishap. By this time, the general features of the manning system of the British Navy are so well known that it is only necessary to remind readers of these notes briefly of the effect of a mobilization. The First Fleet, of course, is fully manned all the year round. The Second Fleet had full complements of active service ratings allotted to it, but only a proportion—three-fifths, one-half, two-fifths, or whatever is fixed by the authorities according to the effectiveness of the vessel—of the full complements are on board during most of the year. The balance crews are drawn from the large number of men undergoing training or re-qualifying in the gunnery, torpedo, signal and other instructional establishments. These schools were closed on July 10th, and on the 13th, after week-end leave, their men were drafted to Second Fleet ships, as they would be in case of war. Six battleships were thus brought up to full strength from the Second Fleet at Portsmouth, five of the "Bulwark" class and the *Albemarle*, and eight cruisers, mine-layers, etc. This filling up of the vessels which have always nucleus crews on board is not a new thing. It has occurred each year since the system was started in 1904-5. But what was a novelty this year was the test mobilization of the Third Fleet, the ships in which have only skeleton crews on board and cannot be completed to full numbers without calling up the reserves in civil life. The Admiralty called out the whole of classes "A" and "B" of the Royal Fleet Reserve from July 15th to 25th, in order not only that they might send the Third Fleet to sea in bulk, but that the arrangements for receiving the men at the ports and drafting them on board might be tested on a large scale, which has never been tried before in peace time. There were busy scenes at Portsmouth barracks in the week ending on July 18th, but the mobilizing machinery worked smoothly and well. As regards the actual events at Spithead, the aerial display naturally attracted greater prominence, and rightly so. All the air stations, even as far off as Dundee, contributed their quota of aircraft, and in addition to the thirty seaplanes and aeroplanes present, four airships also flew to Portsmouth from Farnborough and Kingsnorth. It was quite the biggest event in the history of the Royal Naval Air Service. Apart from the sending of the reserve ships to sea, it has been a quiet month in the dockyard. Dr. Macnamara spent two days in the yard in the first week of the month, receiving petitions from the workmen in connection with their conditions of service, and altogether no fewer than eighty-six deputations saw the Financial Secretary. They were courteously received, but the Doctor made no promises that their requests would be granted, although after going carefully into the matters brought before him he promised to submit them to the Board of Admiralty.

Devonport Dockyard.

We had our full share of the work caused by the mobilization and assembly of the Fleets at Spithead, if not more than our share, for the number of ships sent out to join the Third Fleet was greater from this yard than any other. All the eight battleships of the Seventh Battle Squadron are stationed at Devonport, and seven of them were made up to full crews and sent to sea. The sight of these seven "Majestics" leaving the Sound for Spithead inspired the reflection that, while they are the oldest battleships in the Navy, they would be able to give a good account of themselves in the later stages of a war. They are under twenty years of age, and have been kept in good condition since they were reduced to the reserve. Their distinguished designer, the late Sir William White, might well have been proud of them, even in these days of "Dreadnoughts." During the mobilization the Seventh Battle Squadron was under the command of Vice-Admiral the Hon. Sir Alexander Bethell, from the War College, who flew his flag in the *Prince George*, with Rear-Admiral C. F. Thursby in the *Hannibal*, as his second-in-command. There are no flag officers permanently attached to this nor to other individual squadrons of the Third Fleet. The concentration of ships at Spithead resulted in quite a deserted harbour for the few days following July 18th, but on the 27th and 28th there were a large number of arrivals, as in addition to the reserve ships coming back there are the vessels of the First and Fourth Battle Squadrons, the First Battle-Cruiser Squadron, and the Second Cruiser Squadron due to give manœuvre leave to their crews. The arrival here on July 9th of the Turkish battleship *Osman I.* from Elswick attracted a good deal of attention. The vessel was docked for her under-water fittings to be examined previous to her departure for Constantinople. Possibly because of our superior docking accommodation for big ships, we have had more large foreign vessels docked at Devonport of late years than all the other public yards put together. The principal ship of the Greek Navy, the armoured cruiser *Giorgios Averoff*, was dry-docked three years ago to have repaired the damage she sustained while entering the Sound without a pilot, after being present at the Coronation Review. Now we have the principal completed ship of Greece's rival, Turkey, in the dockyard. The *Osman I.* presented a formidable appearance. Her fourteen 12-in. guns—she is, of course, the only ship in the world to carry so many guns of this or heavier calibre—gave her the look of being "full up" with these weapons, but the opinion was expressed that except at extreme ranges she might be a better fighting ship than if she had only eight or ten guns of larger size and calibre, like the British "Dreadnoughts." Everything, of course, turns on the matter of range. The old battleship *Calcutta*, formerly the *Hercules*, arrived here on July 6th, and presented a picturesque appearance as she was towed into the Sound by the cruiser *Sutlej*. By an odd coincidence, the *Calcutta* has been brought home to England during the time that Rear-Admiral G. H. B. Mundy is serving as Admiral Superintendent of Devonport Dockyard. It was in the *Calcutta* that the Admiral first went to sea, the vessel being then flagship in the Mediterranean.

Chatham Dockyard.

In common with the other dockyards, the past month has been briefly notable at Chatham for the mobilization of the Fleet. It was an unusually big undertaking, the placing of the squadrons on a war footing, owing to the decision of the Admiralty to have a test mobilization of the Third Fleet. In past years, only a general invitation has been issued to men of the Royal Fleet Reserve to volunteer to put in their annual training during the time that the manœuvres were on. According to the numbers who elected to do so, a few ships from the Third Fleet were made up to full complement. But on this occasion, the Admiralty called out all the Royal Fleet Reservists, offering each man a bounty of £1 and exemption from any further training during 1914 and 1915. Therefore, with the 15,000 men who responded there was a general mobilization of the Third Fleet and at the same time a test—unique in peace-time—of the machinery for receiving them at the barracks and depots and apportioning them to the vessels. Most of the ships completed to full crew in the Nore command were cruisers. All six vessels of the "Cressy" type were mobilized; they are at present organized as the Seventh Cruiser Squadron, and just as the Seventh Battle Squadron is manned from Devonport, so the Seventh Cruiser Squadron is manned from Chatham. There is much more organization and order in regard to the reserve ships than was the case a few years ago, when vessels of all shapes and sizes were scattered at the ports, with practically no system for their being promptly manned and sent to sea in case of emergency. It was hoped at one time that our new cruiser, the *Arethusa*, would have been in commission in time to be present at Spithead with the fleets inspected there by King George on July 18th. There is, however, several weeks' work yet remaining to be done in the vessel, and her trial programme has not yet been made known. It is understood that the vessel will be running her trials, however, in the early autumn. About the same time, the launch of the *Calliope*, our second oil-fired cruiser, is expected. The promotion, announced on the King's birthday, of Commander H. W. Bowring to captain has given general satisfaction. This officer has been serving as Flag-Commander to the Commander-in-Chief at the Nore for the past three years. He is expected to remain in this position until Admiral Sir Richard Poore hauls down his flag on August 29th.

Sheerness Dockyard.

The re-organization which took place in the Royal Naval Air Service on July 1st had been expected for some little time. It is the natural result of the growth of that Service, and shows that under the direction of Captain M. F. Sueter the Air Department at the Admiralty which administers the branch is keenly alive to the requirements and necessities of the new arm. The Central Air Office remains at Sheerness, and its chief, Commander F. R. Scarlett, is made a Wing Commander in the new scheme of grading, the principle of which is that officers take rank and precedence in the Royal Naval Air Service according to their seniority or service in the branch, irrespective of their rank or position in the Navy. Thus a lieutenant may be a Wing Commander, while a commander may only be holding the subordinate grade of squadron-commander or flight-commander; and moreover, the non-combatant branches of the Navy and also civilians are now eligible for entry to the Royal Naval Air Service. In this way, the *personnel* of the corps may be built up without draining that of the Royal Navy itself at a time when there is a great demand for officers and men. The presence of so many aircraft at the inspection by the King on July 18th and 20th indicated the great progress made by the Air Service. Seaplanes were present at Spithead from five air stations, and it was noticed that each station sent a different type of machine. Thus from Dundee four 100-horse-power Short machines were present, from Yarmouth four 120-horse-power H. Farman machines, from Felixstowe four 100-horse-power M. Farman machines, and from Grain Island four 160-horse-power Short machines. It is evidently the policy of the Air Department to allot different seaplanes to different stations so that their respective merits may be tried and determined for comparison. In the dockyard, work has been proceeding much the same as usual, with a little more briskness, if anything, just before the departure of the squadrons from the Second and Third Fleets for the Spithead inspection. The *Lord Nelson* returned on June 30th after her five weeks' cruise with Vice-Admiral Sir Cecil Burney, who has inspected the units under his command which have their head-quarters at the other naval ports. The new destroyers of the "L" type continue to arrive for commissioning and for drafting to the Third Flotilla. The *Lennox* arrived at the beginning of July and has been commissioned by Lieutenant-Commander C. R. Dane, formerly of the *Locust*. The *Legion* followed on July 15th, and was commissioned by Lieutenant-Commander C. F. Allsup, formerly of the *Grampus*. The battleship *Russell*, Rear-Admiral Stuart Nicholson's flagship, made an interesting trip to Guernsey on July 7th and 8th in order to represent the British Government at the unveiling of the French Government's memorial in the island to Victor Hugo. The British delegates, of whom Lord Beauchamp was the chief, travelled from Dover to Guernsey in the *Russell*, and in the same way the French delegates made the journey in the cruiser *Dupetit Thouars*. Admiral Nicholson remained at Sheerness, shifting his flag to the *Formidable*.

Pembroke Dockyard.

The celebration of the centenary of the establishment of Pembroke Dockyard took place in the week ending on July 18th. In the June issue of The Marine Engineer the centenary was referred to in these notes, and it therefore only remains to add that the pedestal and powerful gas lamp erected in Albion Square to commemorate the event has now been unveiled, the ceremony including a pageant and carnival and entertainments for the school children. Although Pembroke now occupies rather a humble position in relation to the great establishments at Portsmouth and Devonport, inasmuch as it does not construct big battleships and cruisers, it has done nevertheless some important work, and had a high reputation for efficient and economical working. It was recognised as the principal yard for light cruiser construction, and the improvement of its facilities for the repair of ships, particularly destroyers, appeared to indicate that a larger share of this work might be entrusted to it. As the centenary has reminded us, the yard has known some palmy days. For instance, the first steam warship for the Navy, the paddle ship *Tartar*, was launched here on June 23rd, 1834, and the first to be fitted with a screw propeller, the sloop *Conflict*, was launched in 1846. But before this, in 1827, the 84-gun ship *Clarence*, so named in honour of the Duke of Clarence, who afterwards became William IV., had been launched at Pembroke, and another big ship—in fact the biggest in the Navy of that day—was the *Lion*, of eighty guns, which took the water in 1847. Then it must not be forgotten that Pembroke had the honour of building the three royal yachts to be known as the *Victoria and Albert*. The first was in 1843, the second in 1855, and the third and present vessel in 1899. Construction work now in hand is proceeding at a steady rate; so also is repair work. The destroyer *Griffon* arrived in the first week of July to be refitted, and has taken the place of the *Kale*. Her arrival was welcome for the work it brought. In many quarters the closing of the yard will give cause for regret.

MARINE MOTOR NOTES.

The season for motor boat races around the coast has been good, so far as it has gone, and owners and builders have been busy in noting the events; the weather in but a few cases disturbed the full enjoyment of racers and onlookers. The trials for the representative boats to compete for the British international trophy are to take place about August 1st to select the three best British boats to compete with other national selections. The races will take place about the second week in August.

The steam-driven tug with fore and aft shaft and propeller on each end has a rival in one fitted with oil engines to ply on the Canal for towing barges; for canal work it should be specially suitable with means of propulsion so arranged on account of the narrow waterway. Around the coast the motor pinnace and pleasure boats appear to be doing a good business in carrying visitors for runs in the bay; many however still prefer the row boat, with the exercise of the muscles. The first of the two service boats for the Greek Government being built by Messrs. Thornycroft ran trials recently on the Thames, and gave a good account of herself. There are enquiries for a number of small vessels under consideration by builders, and a tug for barge towing on the Thames, the order for which has been placed. She is to be fitted with Bolinders engines. The launch of the *Mississippi* is one of the interesting events of the month; she is to compete with the sister vessel using steam power for the Atlantic transport service. The builders are Messrs. Harland and Wolff, and the engines are being erected by Messrs. Burmeister & Wain, Glasgow. The Flower Motorship Co. have their first vessel the *Arum*, underway; the other two, the *Arabis* and the *Abelia*, are still in the hands of the builders, but well advanced. Messrs. Barclay & Curle, who built the *Jutlandia*, have in view a large vessel for the Russian East Asiatic Co., to be fitted with twin Diesel Motors by Messrs. Burmeister & Wain.

The transformation of the Copenhagen East Asiatic Co.'s s.s. *Bandon* from steam to oil engines has been effected by Messrs. Barclay, Curle & Co., the original builders of the vessel. The oil engines have been built by Messrs. Burmeister & Wain, Glasgow. Similar changes are being made in other steamers of the Danish Co., to bring them into unison with the more recently built vessels.

The meetings of the Iron and Steel Institute are to be held in Paris from the 17th to the 22nd September.

The New Entrance Lock at Alexandra Dock, Newport, has had Messrs. Wailes, Dove & Co.'s "Bitumastic" solution applied to the suction inlet and make-up pipes, and other steel work in connection with the pumping plant for the lock.

Lobnitz & Co., Ltd., Renfrew, have completed a very powerful gold dredger for the Anglo-Colombian Development Co., Ltd., built under the direction of Inder & Henderson, engineers, London.

INSTITUTE OF MARINE ENGINEERS.

THE foundries of the Manganese Bronze and Brass Co., Ltd., Millwall, were the venue of a most interesting visit by members of the Institute of Marine Engineers on July 4th. The Company was formed in the year 1882 by the late Mr. Percival M. Parsons, for the manufacture of the various alloys with which his name is associated, and which still maintain their high reputation. As early as 1878 Mr. Parsons produced the first high-tension bronze, which became known as "Parsons' Manganese Bronze," and which he introduced principally for the purpose of replacing iron and steel for the propellers of war vessels and fast steamships of the mercantile marine. The views held by him as to the extent by which the speed of steamships could be increased and the fuel consumption reduced by the adoption of bronze were fully demonstrated by the results obtained. It was further shown that the alloy produced by him presented an absolute resistance to corrosion, and at the same time eliminated the heavy expense entailed by the continual replacement of iron and steel propellers.

The Company's works to-day for the production of high-tension bronze propellers of all types and sizes are the best equipped in the world, both in the matter of their capacity for the production of propellers of the largest diameter and weight, and the special machinery which the Company have produced and erected for finishing the huge propellers required for the turbines of such mammoth liners as the *Aquitania*, *Imperator*, *Mauretania*, *Lusitania*, *Olympic*, etc. The finished propellers for vessels of this class weigh approximately twenty tons each, which means that about thirty tons of bronze has to be melted to produce the castings. These propellers have to be so accurately finished and balanced that they can be turned by pressure of the hand when suspended on a mandrel, and it is therefore obvious that, not only are the highest technical knowledge and experience in bronze founding required, but also the finest type of machinery and apparatus to attain the perfection in finish necessary to secure the maximum efficiency.

An inspection of the foundry showed that there are five large pits for the purpose of moulding and casting propellers of the type referred to and, in addition, a number of other pits for the production of single blades used with built-up propellers of all classes. In a side bay are all the necessary ovens in which the various moulds are placed for the purpose of drying, prior to casting. The plant includes a series of electrically-driven overhead cranes, which enable the ladles containing the molten metal to be carried from the furnace to the casting pits with the greatest facility. Two large castings were made in the presence of the representatives of the Institute, and the methods employed by the Company in the founding of the alloy were the subject of the greatest interest. The advent of the turbine obliged the Company to enter into a new field of research with the object of finding an alloy which should present the maximum resistance to erosion. A very complete investigation of the subject, extending over a period of three or four years, finally enabled the Company, with the assistance of their expert chemist, Dr. O. Silberrad, to produce an alloy which can be relied upon to withstand the very onerous conditions to which the propellers of high-speed turbine-driven vessels of all types are subjected.

In the various shops, machines of all types for trimming and finishing the propellers and other castings were inspected. Amongst these, interest was centred in a special machine for trueing propellers to the exact drawing pitch, and other apparatus for finishing and balancing, facing, boring, recessing, etc., all types of propellers and blades, from the smallest to the largest diameters. Many of these machines have been specially designed and constructed by the Company in their own works, and are quite unique in their features. In a separate foundry, various descriptions of general castings were shown in course of construction. It was found impossible to visit the rolling mills, the forge and stamping machinery at the St. George's Wharf Works of the Company on the other side of the river, but a large number of forgings, stampings, pump rods, tubes, etc., etc., were exhibited.

Prior to the tour of the works, the visitors were received by Mr. P. R. Parsons, chairman, and Mr. Chas. F. Parsons, business director of the Company, also by Mr. Chas. Glenwalker, Mr. A. T. Quelch, Mr. L. K. Watson and others, on behalf of the firm. Mr. J. G. Hawthorn and Mr. F. O. Beckett expressed the thanks of the party for the courteous and hospitable manner in which they had been entertained.

RUBBER EXHIBITION.

THIS exhibition, which was incidentally referred to in our June issue, was held in The Agricultural Hall, Islington, from June 24th to July 9th, and proved to be as anticipated, a most interesting display of exhibits illustrative of the products of Tropical climates and of high educational value to the present and the coming generation, investors and workers alike—to those whose means admit of seeking for investments as well as to those whose instincts impell them to look abroad for fresh fields and pastures new, where the harassing conventionalities of too much red tape are unknown and the cries of officialdom not so exacting. Every section of the exhibition gives evidence of the developments which are taking place in the regions represented by the various courts and stalls, not only in connection with the rubber industry, but with that of cotton, wool, tea, coffee, and of agriculture generally. The different methods of tapping the trees for drawing off the milky juice from which the rubber is manufactured and the various tools used, show that the details have been worked out from experience with a view to preserve the trees and get the best value out of them; the appearance of some trees after a series of tappings being that of a herring bone. The interesting series of pictures shown by the lantern gave a good idea of the processes required in order to produce for export the materials desired of other lands. The clearing of the thick undergrowth by fire and hatchet, the preparation of the soil, the rearing of the plants to maturity, the gathering of the fruit, the process of manufacture, so far as necessary or within reach of full accomplishment for the market and the shipment, were displayed on the screen, and formed an excellent means of revealing to non-technical visitors details which enhanced the interest in the articles exhibited, whether rubber, coffee, spices or fruits. Belgium and the Netherlands were represented, also Brazil, Argentine, British East Africa, the West Indian Islands, and each exhibited their sample quota of goods for the markets of Europe. Many well-known firms of rubber manufacturers showed goods, illustrating the many uses to which rubber may be applied, whether for engineering and mechanical purposes or for sport and pastime.

ROYAL SANITARY CONGRESS.

THE Royal Sanitary Institute held its annual Congress this year at Blackpool from July 4th to 11th. The health exhibition in connection with the Congress was opened on the former date by the Mayor of Blackpool. There were some interesting plans, materials and appliances shown, illustrative of the improvements being made to meet the modern requirements in domestic and municipal life and undertakings, all valuable as object-lessons, and some of them as representative of the subjects brought up in the course of the discussions. There was a good attendance of members and representatives of various societies. A reception was held by the Mayor of Blackpool, followed by a luncheon, on July 6th. In the afternoon Lord Derby delivered his presidential address, in the course of which he pointed out the excellent results which accrued from disciplinary training and advocated such training from a health as well as from a national point of view, increasing as it did the stamina and self-control of those who came under the influence of military training. The meetings of the Congress were opened at ten on Tuesday, 7th July, and continued on the following days. Under Sections A (Sanitary Service and Preventive Medicine), B (Engineering and Architecture), C (Domestic Hygiene) a number of very interesting papers were read. Conferences were also carried on by representatives of sanitary authorities, engineers and surveyors, veterinary inspectors, medical officers of health, and port sanitary inspectors. Several of these subjects are of interest from a marine engineer's point of view, and all from a national point of view, and should any of our readers desire to study one or other of them in the light of the discussions held, the full report may be obtained from the Royal Sanitary Institute, of which many of our readers are members and will obtain their copies in due course. The use of paper for handkerchiefs, for napkins and for cooking has become more general of late, but its extension was strongly advocated for many purposes beyond these, where careless washing of utensils used for food may be and has been, the means of carrying infection. The smoke nuisance naturally was brought under consideration, and the wasteful misuse of coal was remarked upon as being not only injurious to the public health, but costly to the user, who by means of improved installation for efficiently burning fuel reaps a double advantage by saving discomfort to his neighbours and monetary value to himself. It was interesting to note that sea water is used in Blackpool for washing the streets and flushing the drains, while a sea-water service is led to most of the hotels, boarding houses and private dwellings. An attempt was made many years ago to introduce a service of salt water to London, but it was not carried out.

At the conference of port sanitary authorities, presided over by Dr. Collingridge, discussions were conducted on the insanitary conditions of shipboard (opened by Dr. Herbert Williams, Port of London); diseases incident upon seamen and the preventions (opened by Dr. Howard Jones, Newport), and rat plague and the powers of a medical officer of health to cope therewith (opened by Dr. W. M. Willoughby, Port of London); each of these subjects was dealt with in a manner worthy of their importance and showed that the efforts which have been made to improve the conditions are not being relaxed. During the afternoons and evenings visits were paid to works and places of interest in the neighbourhood; the whole of the proceedings being of a nature well calculated to enhance the value of the Royal Sanitary Institute to its members and the duties they discharge to their various communities.

In proposing the toast of the Mayor and County Borough of Blackpool, Mr. E. T. Hall, after commenting on the enterprise and public spirit manifest to the visitors, on the part of those who conducted the affairs of the borough, said that a great clamour had been heard lately of State and community controlled affairs, but in the speaker's opinion the nation would go down when its individual initiative was destroyed. Blackpool had risen to be a magnificent borough from what might be termed an unlikely start, in 1800, and the population was now about 114 times what it was then. Its progress and success being largely due to private enterprise and the rates and taxes less than half some other boroughs which could be named, emphasize the comment made by Mr. Hall.

THE HAMBURG-AMERICAN CO.'S "VATERLAND."

THE *Vaterland* is driven by quadruple turbine engines, making normally 185 revs. per minute.

The propelling machinery is accommodated in three engine-rooms, the foremost one of which is 69 ft. long and the two others 95 ft. long. The total forward normal effort amounts to 72,000 h.p., which gives an average speed of 23½ knots. The backward effort of all astern turbines amounts to 35,000 h.p. The steam at "going ahead" passes first to a high-pressure turbine on one of the inner shafts, then an intermediate-pressure turbine on the other inner shaft, and then passes equally divided on to two low-pressure turbines on the outer shafts. Each separate shaft is available, however, by itself for running or manœuvring. The astern turbines are sub-divided into two equal high-pressure and low-pressure turbines, the low pressure being arranged on the outer shafts. The total turbine installation has 760,000 bronze blades. The thrust bearings, which have to take up the thrust of the propellers, have a surface of about 75 sq. ft. altogether. The exhaust steam is condensed in four condensers of pear-shaped section, each having a cooling surface of 16,150 sq. ft. Four centrifugal pumps of 4 ft. 3 in. diam., driven by two engines, supply the cooling water for the condensers. Four double-feed pumps draw the feed water from the tanks in the double bottom, and, in conjunction with four main feed pumps, deliver it into the boilers. It is interesting to note that on her trials extending over two days, at the end of April, from the mouth of the Elbe to the coast of Norway and back, she averaged a speed of 25·8 knots. Against a 60-mile-an-hour gale, she averaged 25·4 knots, with wind behind reached 26·3 knots. The vessel behaved magnificently under all conditions experienced on her trials. The engines developed 90,000 h.p., worked without hitch and entire absence of vibration.

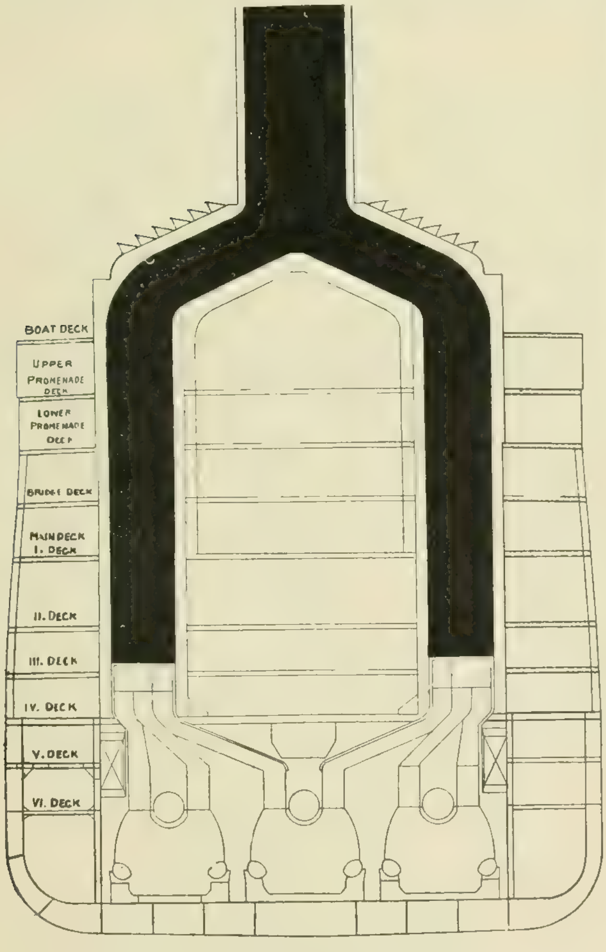
Boilers.—There are forty-six single water-tube boilers arranged in four rooms, each 75 ft. long and extending with their bunkers over the whole width of the ship. The necessary steam is generated at a pressure of 235 lbs. on the inch. The total heating surface is 203,000 sq. ft., and the total grate area 3,760 sq. ft. The air required for the forced draught is drawn by four fan blowers. Each of these blowers has a fan of 13 ft. 9½ in. diam., and forces the air through channels of 45 sq. ft. cross-section into the space under the grating of the furnaces. Four ash-ejector pumps with 6,356 cub. ft. capacity per hour, sixteen ash ejectors, six ash hoists and three ash-cooling valves are provided for removing the ashes from the furnaces overboard. Four steam bilge pumps, each of 4,944 cub. ft. capacity per hour, continuously empty the bilges of the engine and boiler-rooms. Four feed-water purifiers, two oil separators, as well as two mixing feed-water heaters and two economisers for heating the feed-water, are provided.

Engine-Room Staff.—In the engine-room there are the chief engineer, three first engineers and twenty-five engineer officers, besides a small army of greasers, stokers, trimmers, etc., numbering about 350.

Electricity—An efficient electric lighting system contributes to the comfort and safety of the vessel.

Current is generated by five turbine dynamos of 2,000 ampères and 110 volts, which serve to give power to 10,000 electric lamps on the ship. A sixth dynamo of 100 ampères is placed far above the water line, ensuring light even if the machines in the lower engine-room are disabled. A completely fitted machine shop is situated in the forward engine-room, containing all the latest and most powerful machines, including lathes and drills, planers, etc.

Bulkheads and Water-tight Doors—The vessel is divided into a large number of water-tight compartments, both transverse and longitudinal, extending from the double bottom 50 feet upwards, which are all of exceptional strength and height. The forward or collision bulkheads extend through the top deck, and aft, longitudinal and transverse bulkheads afford extra protection to the shafts and tunnelling. The water-tight bulkhead doors are operated on the Stone-Lloyd hydraulic system, which provides for the opening and closing of all doors by pressure. The hydraulic medium is constantly in circulation through small pipes led round the ship in interior protected positions. This pressure passes, and returns, through a central controlling valve, which is operated from the bridge. At each door, whether vertical or horizontal sliding, it passes through the door controlling valve to the operating cylinder, the piston of which is in gear with the door. When the handle on the bridge pedestal, which is connected with the central controlling valve, is turned up, all the doors throughout the ship open, when the handle is turned down all the doors close. When the doors begin to close mechanical gongs give notice of the fact. The doors close in about twenty seconds, and the pressure is sufficient to enable them to crush through coal, which is of special interest where bunker doors are concerned. At the same time each door can be operated by means of its local control valve. Thus, when the opening pressure is "on" from the bridge, any named door can be closed by moving a lever connected with the door valve, and it will remain closed until the lever is reversed. Similarly, if the closing pressure is "on" from the bridge, any named door can be opened—as, for instance, to allow a man to pass through—by actuating the door valve lever; but, contrarily, directly the hand pressure actuating the lever is removed, the pressure which is "on" from the bridge resumes its sway, and the door automatically re-closes. Safety is assured even if four or more adjacent compartments be filled with water. Exhaustive tests have been made in order to determine this. Several of the compartments have been completely flooded at the same time, proving that the steel partitions are perfectly water-tight under extreme conditions. An idea of the strength of their construction is gained by noting the weight of the braces supporting them, which range from 3,000 to 9,000 pounds each. The single amidship bulkhead alone added a weight of 66 tons to the ship.



Amidships cross-section of the *Vaterland*, showing how the funnels divide to avoid passing through the centre of the decks.

Lifeboat Equipment.—Eighty-three lifeboats are provided, two of which are motor boats, the boat installation having accommodation for 5,600 people, which is above the full complement of passengers and crew. A large number of lifeboats have been removed from the top deck to the lower promenade deck, 20 feet below. During a test at sea of the launching machinery, while the vessel was on her trials, without any previous experience, boat after boat was lowered away, sometimes by one, sometimes by another, the average time taken being fifteen seconds, corresponding to a lowering speed of from four to five feet per second.

The vessel is under the command of Commander Ruser, the Commodore of the Hamburg-America Co.'s fleet, who has the assistance of one acting and three reserve captains and seven officers.

The vessel has been built under the rules of the Germanischer Lloyd and allied societies.

Station bells, locating the number and position of each man on board, from the captain down to the last trimmer, assemble the crew when occasion requires.

The vessel is supplied with a gyroscopic compass, submarine signals, a searchlight on the foremast of 150,000 candle-power and, of course, wireless telegraphy. This installation, in charge of three operators night and day, is the largest and most complete that has ever been constructed on a ship.

The summer meeting of the Naval Architects, Engineers and Shipbuilders in Scotland and the North-East Coast Institution, held at Newcastle-on-Tyne, July 7th to 10th, passed off very successfully, and a large number of the members and their friends attended. The papers read before the members were of a very instructive character and will be reported in a later number of this journal.

Mr. ANDREW COCHRANE, Senr.

THE subject of our photo, Mr. Andrew Cochrane, founder of the well-known firm of steam trawler builders, Messrs. Cochrane & Sons, of Selby, celebrated his golden wedding on the 11th of July. A committee, representing the employees of the yard, arranged a presentation to Mr. and Mrs. Cochrane, and the gift was presented on the date above mentioned, after the launch of two vessels. Mr. Cass, foreman joiner, who has been with the firm for over thirty years, asked Mr. Cochrane's acceptance of the gift, which took the form of a gold loving cup. An inscription on the cup reads, "Presented to Mr. and Mrs. Cochrane on the occasion of their Golden Wedding by the employees of Cochrane & Sons, Ltd." On the other side is a representation of the trawler *Emerald*. A number of other presentations have been made, including one by the Hull Presbyterians. Mrs. Cochrane, who is the same age as her husband, *viz.*, seventy-four years, was formerly Miss MacGill, of Bowling, a daughter of the late Mr. MacGill, shipbuilder, of that place.

Mr. Andrew Cochrane was born in Wigtownshire and served his apprenticeship in Dumbarton. He has had fifty-eight years' experience in the shipbuilding industry, and founded the shipbuilding firm of Messrs. Cochrane & Sons, at Beverley, where business was carried on for some years, but for the past sixteen years the yard has been established at Selby. Since starting business on his own account over 600 vessels have been built by him. Last year alone, thirty-nine vessels were built by the firm, and they have now sufficient work on hand to last until May, 1916. Counting the vessels completed and those booked to date, a total of 680 is reached. The firm, who now employ over 700 men, have had the distinction of building the largest steam trawler in the world, *viz.*, the *Maroe*, built for French owners. Mr. and Mrs. Cochrane, who, it is a pleasure to record, enjoy the best of health, have two sons and two daughters, all of them being married. The eldest son, Mr. Andrew Cochrane, Junr., who resides at Selby, is the Managing Director of the shipyard, and is also a member of the Selby Urban Council.

On July 15th, Sir Ernest Shackleton, C.V.O., commander of the Imperial Trans-Antarctic Expedition, gave a reception on board the steam yacht *Endurance*, lying in the South West India Dock. The guests were invited to meet the Master, Wardens and Court of Assistants of the Shipwrights Company. The guests were shown over the ship and the numerous points of interest were explained to them by Sir Ernest Shackleton and his officers.

Mr. HUGH M. MACMILLAN.

OWING to the resignation, some little time ago, of Mr. Alexander W. Sampson, shipyard manager to the Fairfield Shipbuilding & Engineering Co., Ltd., after fourteen years' service in that capacity, Mr. Hugh M. Macmillan, who for the past eight years has occupied the position of General Manager to the shipbuilding yards of Messrs. Workman, Clark & Co., Ltd., Belfast, has been appointed to succeed. Mr. Macmillan, who will have a seat on the Board of Directors, has now entered upon his duties at Fairfield. He is still under forty years of age, and it is of peculiar interest to state that it was in the Fairfield Works he served his full apprenticeship to shipbuilding. Before entering the drawing office he had practical experience in all the constructional branches of the shipyard. Concurrently with, or immediately following upon, his drawing-office service, he attended the University of Glasgow, and in 1898 he graduated with the B.Sc. degree in Engineering Science and Naval Architecture. After the completion of his apprenticeship, Mr. Macmillan remained with the Fairfield Company for several years, following which he served in various other Clyde establishments. He left the Clyde district in 1901, to take up the appointment of chief draughtsman at the Neptune Shipyard of Messrs. Swan, Hunter & Wigham Richardson, Ltd., at Walker-on-Tyne. He remained with the Tyneside firm for five years and left them in 1906 to fill the position of shipyard manager with Messrs. Workman, Clark & Co. That, while still "on the right side of forty," Mr. Macmillan has returned as a director and shipyard manager of the famous works where he served his apprenticeship, is striking evidence of the ability he has displayed in the shipbuilding profession, and his advance is a source of satisfaction to his many business and social friends on the Clyde and Tyne and at Belfast.

WELIN DAVITS

A considerable amount of space could be devoted to describing the handsome volume, formally called a catalogue, which The Welin Davit and Engineering Co., Ltd. have recently issued. As is to be expected the volume deals with the different types of davits fitted by the Company, but in such a way, that the work is made of great interest to the reader. The volume is produced in oblong form of about 14 in. by 9 in., and comprises nearly 350 pages on art paper and shows the various applicatons of the Company's davits. The illustrations are in most cases full page ones and are in a great number of instances reproductions of photographs, showing actual installations. A feature of the work is the fine collection of ships and shipping illustrations it contains. One page shows a plan of a suggested re-arrangement of the boat deck of a modern liner, fitted with 42 ft. cabin boats and with total accommodation, including four motor launches and two emergency boats, for 5,200 persons. Each cabin boat is designed to hold 200 persons. The Lundin life-boat is also described in the pages of the volume. Welin davits are of course well-known to all engaged in the maritime world, and their products are of a high-class character. As stated in the notice prefacing the book, "There is no ship afloat, no matter what size, type or description, which may not with advantage, be fitted with one or other of the numerous types of boat launching-gear evolved by this Company. Welin davits with their accessories cover the whole ground." The Company say they are prepared to enter into contracts with shipowners to bring fleets of passenger steamers into line with the requirements of the International Convention, in so far as the boat and davit installations are concerned. Their experience and organization enable them to execute contracts with efficiency and without unduly delaying the ship. The price of the volume is £1 1s.

The Shipping, Engineering and Machinery Exhibition, to be opened on the 25th of September, promises to be a great success. The exhibits are to be of a most varied and comprehensive character, and will undoubtedly be of great interest to all persons engaged in the shipbuilding, marine engineering and shipping industries. Since the last list of names of exhibitors published, we notice that a considerable number of other firms have taken space at Olympia.

THE "HOTCHKISS"
IS THE
Only Circulator
IN WHICH THE FLOW OF WATER
CAN BE TRACED ALL THE WHILE
THE BOILER IS ALIGHT.

Its Action is Automatic.
It starts working soon after fires are lit—it continues working all the while the boiler is warm.

It is the Only Circulator
which Collects and Removes Mud, Oil and Air.

It is the Only Circulator
which Delivers Hot Water to Bottom of Boiler.

It Does Not Obstruct
Inspection or Cleaning of Boiler

It Prevents
Unequal Expansion, Priming and Pitting.

It Increases
LIFE OF BOILER.
STEAM OUTPUT.

For further particulars, descriptive booklet or appointment to see working model, apply—

Arthur Ross, Hotchkiss & Co. Ld.
1, GLENGALL ROAD,
Old Kent Road, London, S.E.
Telephone No.—Hop 977.
Telegraphic Address:—"Disincrust," London.

R.M.S. OLYMPIC
46,359 TONS
WHITE STAR LINE

WORKS
LONDON
BELFAST

Sole Manufacturers
D. ANDERSON & SON Ltd.
Head Office } West Hartlepool
Marine Dept. } Manager, S.M.CORY

TELEGRAMS
CORY, West Hartlepool
ULSTER, London
ANDERSON Belfast

ANDERSON'S
Siderosthen
ANTI CORROSIVE
SOLUTIONS
WERE APPLIED TO THE
BUNKERS, STOKEHOLDS etc.
OF THIS VESSEL WHILST
OVERHAULING at SOUTHAMPTON
Jan: 1914

ELECTRICAL PLANTS FOR SHIPS

¶ Four 400-kw., 225-volt., 1500-r.p.m., Turbo-Generator sets have been supplied to Messrs John Brown & Co., Ltd., for the Cunard S.S. Co.'s

Q.S.T.S. **AQUITANIA**

¶ Six 250-kw., 225-volt., 3000-r.p.m., Turbo-Generator sets and two 18-kw., 4000-r.p.m. sets have recently been supplied to Messrs. Wm. Beardmore & Co., Dalmuir, and the Fairfield Engineering and Shipbuilding Co., Govan, for the quadruple screw-turbine Allan liners—

ALSATIAN and **CALGARIAN**

BY

The British Westinghouse
:: :: Electric & Mfg. Co., Ltd., :: ::
TRAFFORD PARK, MANCHESTER.

"KELVITE"
Compasses
AND
Sounding
Machines.

REGISTERED
KELVIN, BOTTOMLEY & BAIRD, LTD.
NEW TRADE MARK

SPECIFY

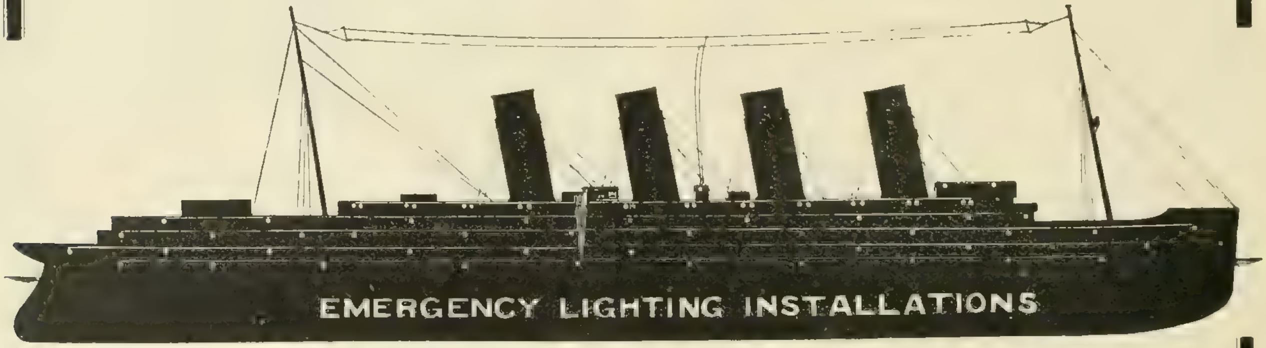
Kelvite Standard Compass.
Kelvite Steering Compass.
Kelvite Vertical Card Compass.
Kelvite Motor Driven Sounding Machine
Kelvite Mark IV. Sounding Machine.
Kelvite Merchant Pattern Sounding Machine.

KELVIN :: ::
BOTTOMLEY
& BAIRD Ltd.
(— Formerly Kelvin & James White Ltd)

Sole Makers
of
the Genuine
Lord Kelvin Compass

16-20, Cambridge St., GLASGOW.

Electrical Installations on Steamships.



W. C. MARTIN & CO.,
Contractors for the Electrical Installation on the
Cunard R.M.S. "AQUITANIA."

JAMES LOWSON, M.I.E.E.
GILBERT AUSTIN, A.M.I.E.E. } PARTNERS.

GLASGOW:
Head Office:
10, WEST CAMPBELL STREET.
Telegrams: "Motive," Glasgow

LONDON:
2, GRESHAM BUILDING,
BASINGHALL STREET, E.C.
Telegrams: "Tribord," London.

The Cunard Company's Liner "Aquitania."

LIFE-SAVING EQUIPMENT.—While in the *Aquitania*, one of the world's largest and most luxurious ocean passenger ships, the utmost ingenuity and skill have been exercised in producing a vessel structurally embodying the prime quality of safety from foundering or from fire, it is none the less true that equally great care and skill have been expended in providing life-saving equipment to thoroughly meet the possible, but remote, contingency of disaster. Broadly speaking, the great vessel, notwithstanding the huge character of her accommodation for passengers—accommodation which for comfort and luxury even the most superb hotels on shore do not eclipse—represents almost the last word in marine architecture, not only from the point of view of minimising the effects of possible disaster, but of securing complete immunity from mishaps.

Leaving aside meanwhile the matter of life-saving provision in the shape of life-buoys, life-belts, etc., and merely mentioning the marvellously potent factor of safety represented by the Marconi installation of wireless telegraphy, the leviathan vessel is equipped altogether with eighty-two life-boats, twenty-two of which are of the standard class of open life-boats, each having capacity for sixty-six persons (some slightly more) and fifty-eight of which are of the "decked" and "collapsible sided" class having each accommodation for fifty-four persons. In addition there are two motor life-boats fitted with Thornycroft engines and equipped with wireless telegraphy as fully described and illustrated in the June issue.

All this equipment is in evidence on the boat-deck, and must convey to the timid voyageur a distinct feeling of security. For most part the boats are arranged in the conventional way along each side of the boat deck. There are eleven sets of boat davits of the ordinary form on each side, and on a short length of deck aft there is on each side a set of davits of the "Welin" double-acting quadrant type together with an inboard set of davits of the same type, so disposed and arranged as to be capable of expeditiously dealing with decked semi-collapsible lifeboats ranged across the whole breadth of vessel. Underneath each set of davits of the ordinary form is housed one lifeboat of the ordinary open type and underneath this again is one decked lifeboat; the arrangement occupying no more space than if one boat of the open standard type was housed under the davits.

The twenty-two lifeboats of open standard type are each 30 ft. by 9 ft. 4 ins. by 4 ft., and are constructed with internal buoyant tanks of copper and with external buoyancy of cork and canvas, which also acts as a fender against the side of the ship when the boat is being lowered. All the open boats were supplied by Mr. R. D. Lambie, of Wallsend-on-Tyne, and in most cases they are fitted with McKay's patent disengaging gear, manufactured by Messrs. H. Grayson and Son, Birkenhead, the remainder being fitted with Mills' disengaging gear as invented and supplied by Messrs. W. Mills, of Sunderland. Both gears have been severely tested and fully approved by the Board of Trade, and are already adopted in many ocean liners. By means of them the boats, when being lowered, cannot become disengaged from the blocks and falls until they are fully water-borne.

All the decked lifeboats on board, fifty-eight in number are of the collapsible bulwark type, invented and manufactured by Messrs. Hugh McLean & Son, Ure Street, Govan, already fully described and illustrated in our pages (see issue for December) and now greatly in favour where extra large boat capacity in small space, and readily handled, are conditions to be fulfilled. When space permits of it along the boat deck two McLean decked boats, one above the other, are housed abreast and inboard of the ordinary boat and decked boat under the davits. Means are provided for readily bringing these extra boats under the davits in the shape of Martin's patent boat transporter. This consists of two trackways, on each of which runs a carrier fitted with chocks, the two carriers being connected together by a shaft. By turning a crank which actuates a worm gear the shaft is revolved and the boat is run out under the davit. The transporter occupies no more room than the boat itself, and the

The Garden Lounge, 1st class, *Aquitania*.

Second-class Main Staircase.

The Chair Deck of the *Aquitania*.

The Swimming Bath.

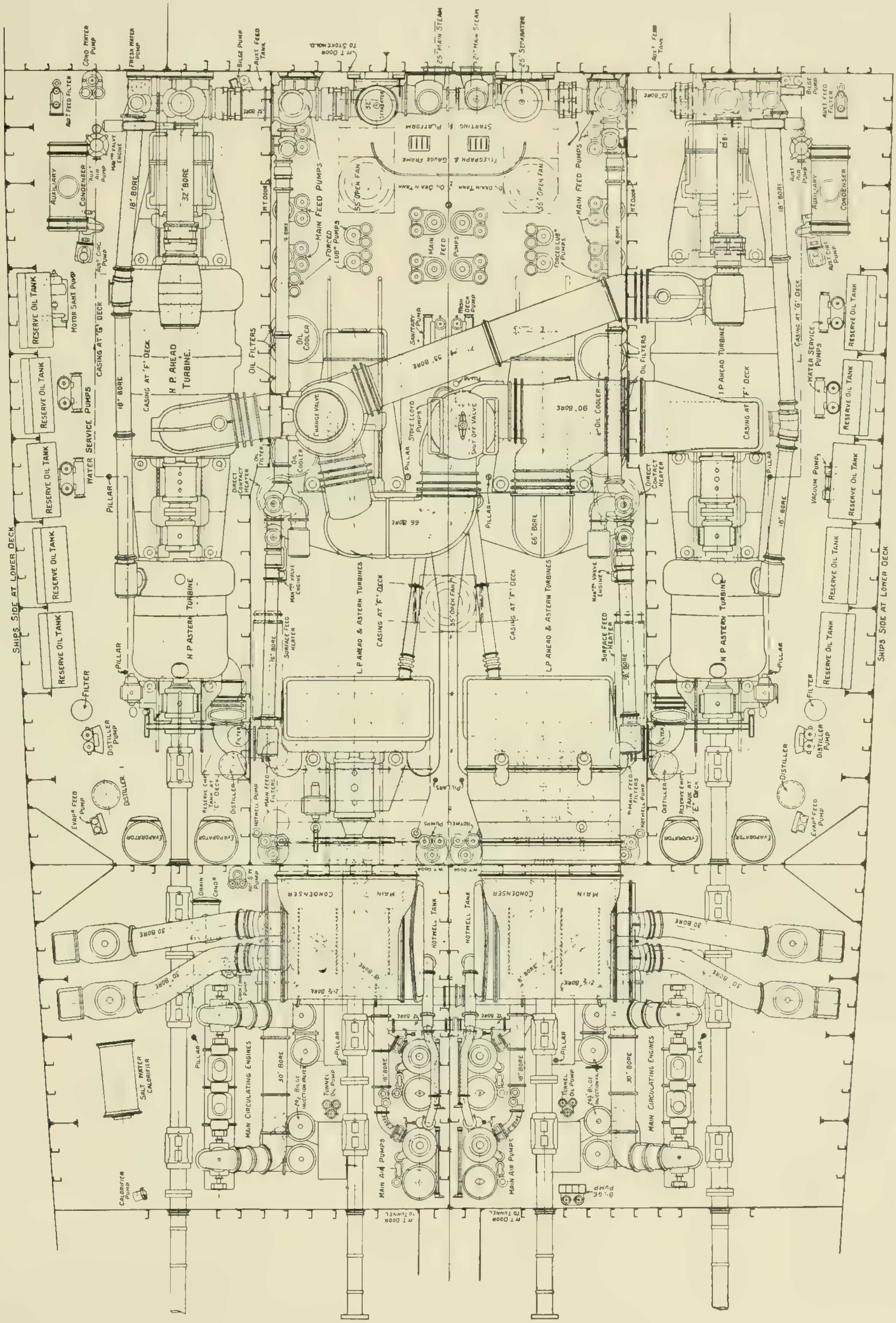
trackways are hinged so that a clear passage way is available on either side of the inboard tier of boats. One man can operate the transporter, and as it is under worm gear there is no risk of the boat getting out of hand.

Excepting the Welin davits aft, which will be described later, the davits are of the steel tubular type, and were supplied by Messrs. Stewarts and Lloyds, Limited. They are of tubes $\frac{11}{16}$ ins. thick and are $11\frac{3}{4}$ ins. diameter at their fullest part. They are 24 feet high from heel to head piece, and are of uniform taper —*i.e.*, there are no reductions in diameter by steps— and they are each one ton in weight. The substitution of tubular for solid davits, it may be stated, has been principally brought about by the saving in weight effected by their use, the tubular form yielding equal strength for about half the weight. Each of the davits is actuated through mechanical gearing hand operated, and both davits and their suspended weight can be slewed outboard quickly and against a possible list of 15 degrees on the part of the vessel. The gear, briefly described, is of the worm and pinion type, resembling in principle many other practical mechanical apparatus in every-day use. The worm wheel and pinion are contained in a separate pedestal, and engage with a larger gear wheel, forming an actual fitting on the body of the davit near the gunwale of the boat deck. Connecting with the worm is a crank at which, if necessary, two men can operate. The arrangement has been devised by the builders in conjunction with members of the superintending staff of the Cunard Company. It may also be stated that power is also utilized in connection with the davits (but for hoisting the boats only), two boat winches, with cylinders, 6 ins. by 10 ins. and 8 ins. by 12 ins. respectively, having been fitted on board by Messrs. J. H. Wilson & Co., Ltd., Birkenhead.

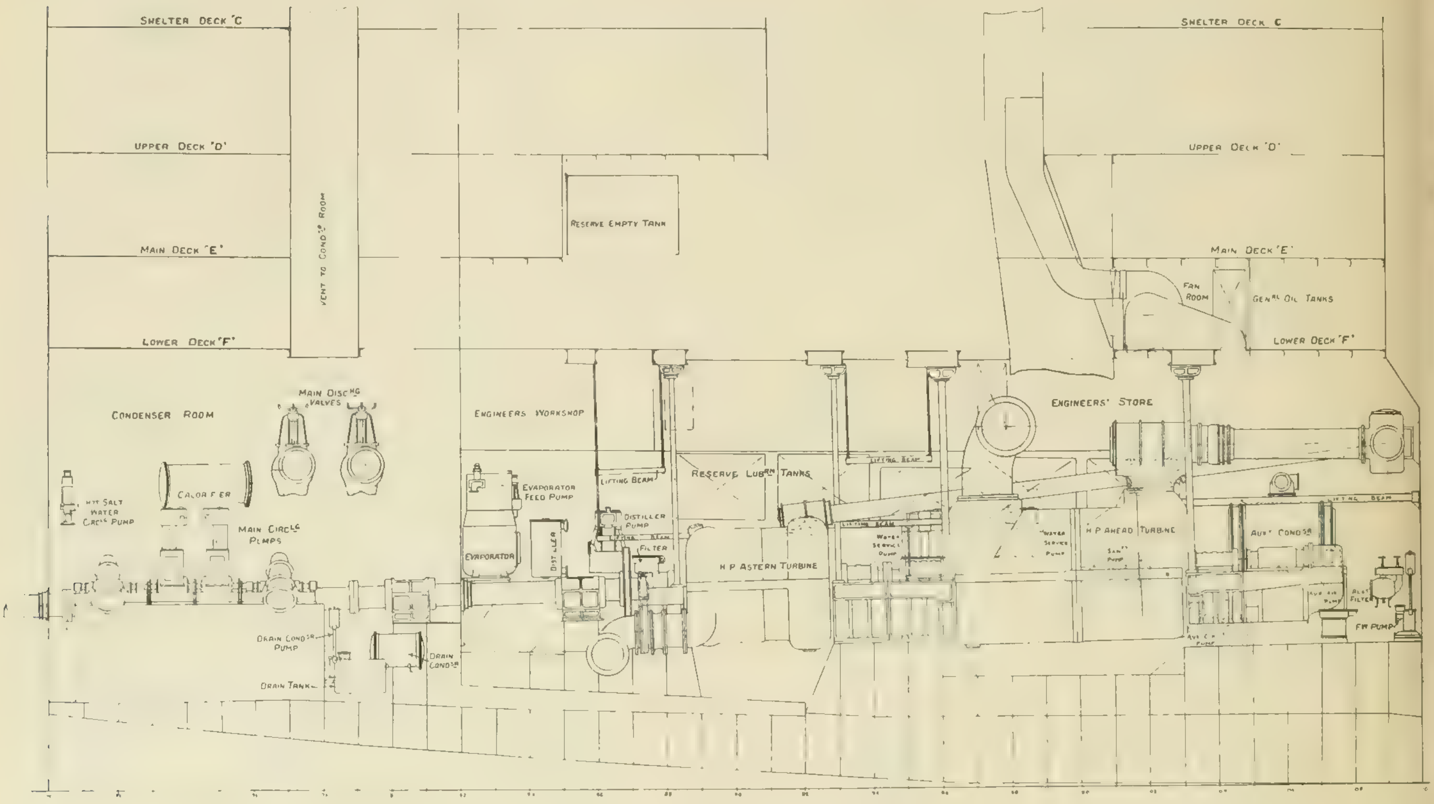
The thwartship range of McLean's lifeboats on poop deck, sixteen in number, are, as already mentioned, expeditiously dealt with by Welin quadrant davits, double-acting type. All the davits, one set on each side and two sets inboard, are arranged for use with wire falls, which are coiled upon Welin patent controls. The main feature of this control is that the drum upon which the wire is coiled is in itself movable, and by means of an eccentric lever is thrown into a small friction driving collar, or conversely into a friction brake, by which means all the usual troublesome complications in the way of clutches, band brakes and so on are entirely avoided, the drum forming its own clutch. On the davit at the opposite end from the control is also fitted Welin's patent wire fall adjuster which makes it possible to lower the boats into the water at any required angle. The falls are $\frac{7}{16}$ in. diameter, and are of special extra flexible galvanised steel, and are besides of a "non-spin" type, so that with the special form of non-toppling block provided there is no trouble whatever in getting the tackle back again quickly. While the top and bottom outboard boats are being put into the water the two sets of inboard or "feeding" davits are busily engaged in picking up the inboard boats and placing them in position for hooking on to and being lowered by the outboard davits. An interesting feature of the feeding davits is that a wire span is arranged to the davit-head in such a way as to compensate entirely for the arc described by the davit-head, and the decked boats move from side to side of the ship on a perfectly level keel, so that a minimum of effort is required for their manipulation.

A complete and well-distributed outfit of life-saving media in the shape of life-buoys, life-belts and life-jackets is an additional, and not by any means a minor, provision on board the *Aquitania*. All the items comply with the British and American B.O.T. regulations, and comprise thirty cork lifebuoys and 1,000 cork lifebelts supplied by Messrs. Steedman and McAlister, Glasgow, and over 3,000 lifejackets of the "Boddy" type which depend on the vegetable fibre Kapoc for their buoyant property.

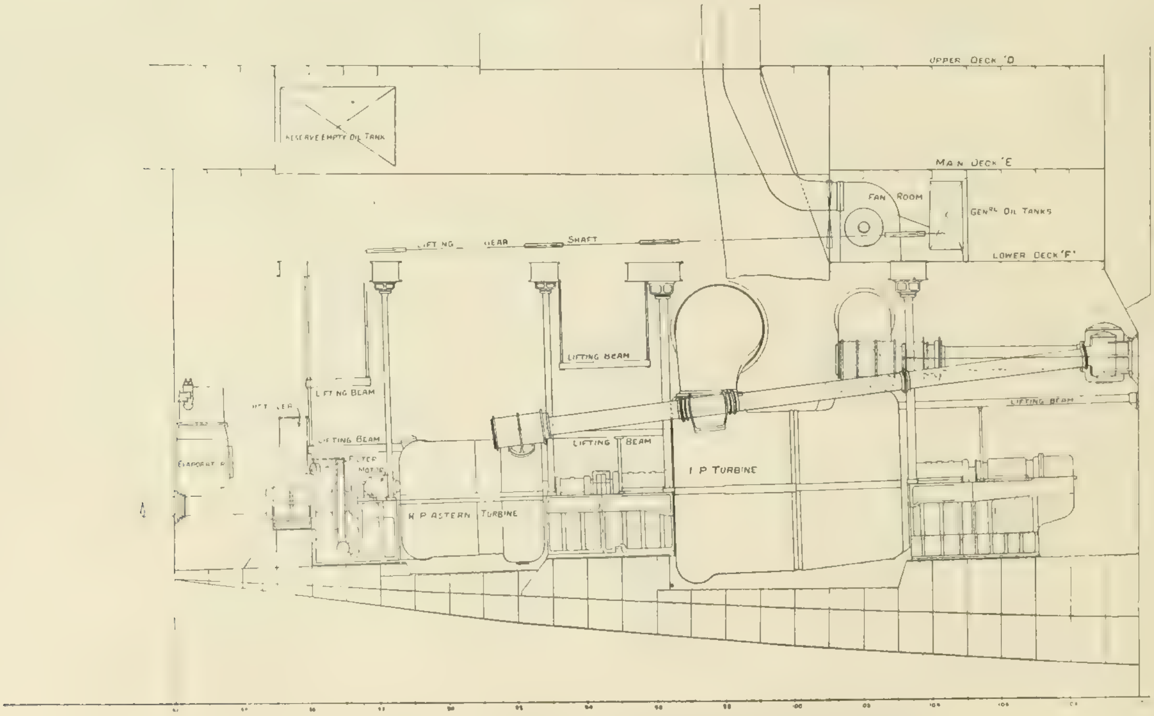
Passenger Accommodation, Decorative Features, etc.—The passengers of the *Aquitania* will find provision made for the most varied tastes. Those who prefer seclusion can have their own suite of rooms where they may entertain their friends, and to others who prefer the social atmosphere, the lounge, the smoking room, the drawing-room, etc., will appeal. Musicians play in the gallery of the restaurant, and pleasant exercise may be had in the swimming bath or in the completely appointed gymnasium. Open and covered promenades extend in unbroken line for

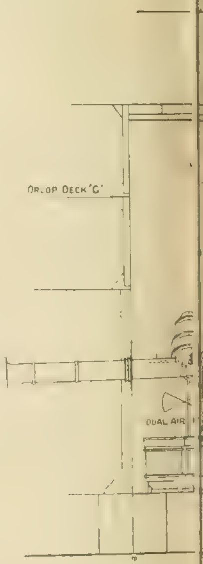


The "Aquitania." Plan of general arrangement of machinery in engine rooms and condenser rooms.



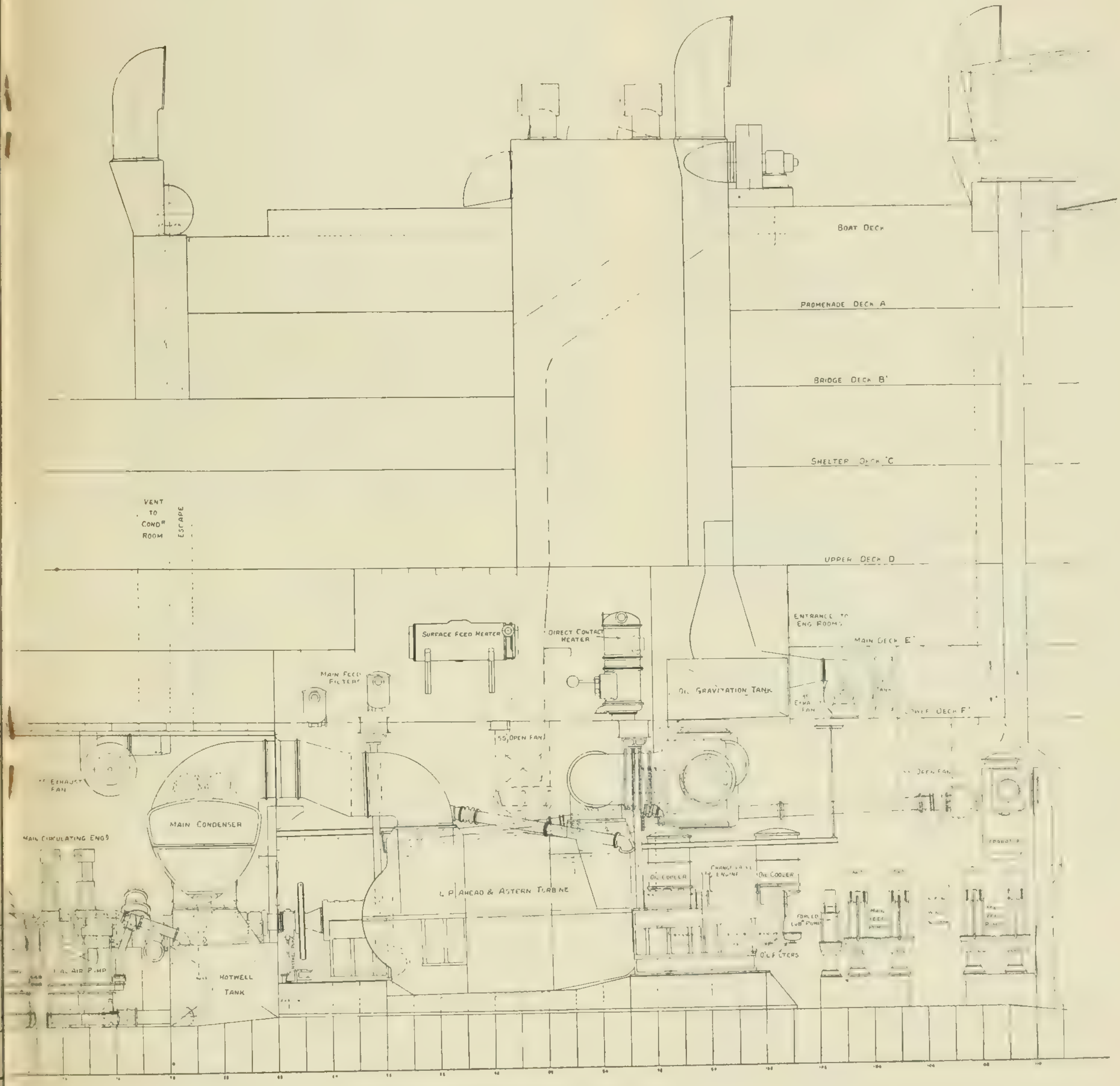
ELEVATION OF PORT WING TURBINES LOOKING OUTBOARD





ELEVATION OF STARB^{D} WING TURBINES LOOKING INBOARD

Aquitania. **Elevations of the arrangement**



ELEVATION OF CONDENSER ROOM & CENTRE ENGINE ROOM

of Machinery in Engine and Condenser Rooms.

Library and Writing Room, *Aquitania*.

First-class State-room.

hundreds of feet. Throughout the ship are replicas, by the most expert artists and craftsmen of the present day, of the works of the great men of the past, and the artistic and historic interest of the tapestries, carvings, paintings, prints and other decorative features cannot be over-estimated. The main entrance hall contains an original decorative painting by Pannini and a carved bas-relief in the style of Clodian. In the smoking room are two large decorative painted panels after Claude, from originals in the National Gallery, and a fine portrait of Lord Sandwich, the hero of Solebay. Most of the carved trophies here have been copied from old ships at Greenwich, notably the *Sovraigne of the Seas* (1637), the largest ship of her day. Two of the most striking features of the lounge are the genuine old Dutch ceiling painting on canvas, and the reproduction of the famous Mortlake tapestry representing the Battle of Solebay. In the drawing-room the walls are hung with a collection of mezzotints of 18th-century beauties. Of unusual interest both to English and Americans are the engravings in the smoking room, for they represent those people who figured most largely in the early pages of United States history, and include a reproduction of the Declaration of Independence. The collections of prints play a prominent part in the adornment of some of the rooms. Eight series, representing the work of famous old masters, are hung in eight different suites of rooms, giving to each suite the name of the original painter of the pictures. These suites are: Romney, Holbein, Vandyk, Velasquez, Rembrandt, Raeburn, Reynolds and Gainsborough. The luxury and completeness of the appointments of these suites are very great. The larger ones consist of three bedrooms, sitting-room, spacious hall, two bath and toilet rooms and private verandah, forming a complete suite or elegantly furnished flat.

Berths, with the exception of a few two and three-berth rooms, have been abolished, giving place to wooden bedsteads. All the rooms, with the exception stated above, are fitted with one or two beds only, and the majority have bath and toilet rooms adjoining. The rooms are of exceptional size, and the appointments—such as wardrobes, closets, drawers, dressing tables—are upon a corresponding scale. The floors are covered with carpets of tasteful design. Hot and cold running water is laid on to each state-room, and the tip-up wash-bowl has disappeared, making way for large fixed porcelain basins. The complete system of ventilation ensures a constant supply of fresh air. All outside rooms on "A" and "B" decks have sliding windows overlooking the promenade. In other rooms an overhead window, under the control of the passenger, is fitted, and thus admits both light and air. An electric radiator, in addition to the heating supply, is provided, which can be regulated by the passenger.

Prepared as one may be for big rooms, it may come as a surprise to know that the floor area of the restaurant is 13,500 square feet, and is nearly 150 feet in length by 100 feet in width; that the first-class smoking room and lounge measure 78 × 54 and 74 × 54 feet respectively; that the foyer has an area of nearly 4,500 square feet; and that the grill room measures 71 × 35 feet. The long gallery stretches for nearly 150 feet from the first-class smoking room to the lounge. The swimming bath for the first-class passengers is of large proportions; the depth of water at the shallow end is 4 ft. 6 ins. and at the deep end 7 ft. At the sides of the bath are a number of cubicles with hot and cold douches. The gymnasium adjoins the swimming bath and is fitted with all necessary appliances for recreation and exercise. Skilled instructors are in attendance.

Second cabin passengers have particularly spacious accommodation provided for them. In addition to the usual public rooms, a gymnasium and a verandah café are available—two features which have proved immensely popular in first-class accommodation. Elevators, communicating with six decks, are installed. The public rooms are upon a very large scale. The dining saloon is an imposing apartment 104 feet in length and stretching across the whole width of the ship. The wall panels are adorned with paintings adapted from decorative panels by Pergolesi. The well over the salon is bordered by an enriched plaster frieze surmounted by a wrought-iron balustrade, copied from a famous Adam balcony. The drawing-room has a floor area of 2,500 square feet. Ordinary sash windows take the place of portholes, and this gives the apartment a particularly bright and

First-class Lounge.

cheerful appearance. The smoking room adjoins the verandah café, which commands a magnificent view over the stern of the vessel. The general idea for the decoration of the smoking room has been taken from a room in Kensington Palace, and has panelled oak walls, with a beautifully carved fireplace at one end.

The lounge is a lofty and spacious apartment, treated in the period of the Brothers Adam, with decorative pilasters similar to those at Sion House, a residence of the Duke of Northumberland. The second-class state-rooms are large, well ventilated, lighted by electricity, and complete in every detail of furnishing and decoration. There are a number of single-berth rooms and others for two and parties of three and four friends. The berths are broad and long with spring mattresses hung with chintz curtains. There is fresh running water in the basins, large mirrors are provided, and all the rooms are carpeted with a velvet fabric in delicate and harmonious tints.

If the passenger accommodation is upon a scale unrivalled, the same may be said with equal truth of that portion of the ship devoted to the kitchens. Here all the latest appliances of modern culinary art are installed, and every possible operation is performed by electricity, which ensures cleanliness. Most of the machines have been built especially for the ship. The refrigerating rooms have been brought to the pitch of perfection, and there is not a dainty to be obtained on shore that does not find its way into the Cunard menu.

The *Aquitania* may be used as and when necessary, by the Admiralty, for naval service, and consequently provision has been made for the carrying of twelve guns, four on "B" deck and eight on "C" deck; the positions will be seen on the plans issued as supplements with this journal.

The vessel is commanded by Captain Turner, Commodore of the Cunard Fleet and formerly of the *Lusitania*, who has with him two staff captains and seven officers. The chief engineer is Mr. Bryce, who has been thirty years in the service of the Cunard Company and also came from the *Lusitania.* In addition to Mr. Bryce there are thirty-four engineers on board.

DETAILS OF ELECTRICAL WORK.—As is naturally to be expected, the electric light and power installations of the Aquitania have been carried out in the most up-to-date method, special precautions having been taken to eliminate all risk of fire: while design and neatness have also been an important consideration. This important and intricate work has been executed by Messrs. W. C. Martin & Co., of Glasgow, whose reputation for this class of work is widespread.

Included in the 9,000 lights fitted throughout the vessel are 100 sign lanterns, placed at entrances to passages, lavatories, etc., and about 500 lights connected to an emergency circuit. The emergency lighting supply is obtained from a Diesel oil-driven generating set placed on A Deck aft (second topmost). Being so placed, its purpose as a source of supply is completely fulfilled, light being maintained, as well as wireless communication, in the case of emergency.

In connection with the navigation lights, of which there are five, one of "Martin's Duplex" indicators has been fitted, while two Admiralty Morse signalling lamps have also been installed.

Roughly speaking, the total length of single wires installed equals 135 miles, and that of stranded and

First-class Salon.

The Restaurant, *Aquitania*.

multiple cables, 65 miles; making in all some 200 miles of cable laid from stem to stern. The gross weight of all wires, including insulation, is estimated at about 45 tons, and the total weight of copper some 25 tons. If rolled into a No. 16 wire the same would stretch over 700 miles. The largest cable is ·75 sq. inch cross section, and there are about 4,000 yards of ·5 cable, and various lengths of ·35, ·3, and ·25 sq. inch cross section. In round figures, 90,000 porcelain insulators, and 100,000 screws have been used in the work.

The following items are also included in the installation :—About 300 fire alarms, thirty intercommunication telephones, eighteen loud-speaking telephones, communicating between bridge, forward, crow's nest, aft bridge, engine room and steering engine room, etc., forty electric clocks, 1,500 bell pushes, seventeen life boat lamps of 180 and 360 candle power, over fifty foodwarmers, twenty hotplates and toasters in pantries and galleys, together with dough-mixer, cobmachine, two electric grills in grill room, taking 30 H.P., plate washers, potato-peeling machines, ice cream freezer, knife cleaners, etc., etc., the motors for which total about 25 H.P., three first-class passenger lifts, two second-class passenger lifts, two baggage and two stores lifts, one service lift, having a total Horse-Power of 360.

The ventilation is carried out by means of about ninety fans varying from 10 inches to 35 inches in size, forty thermotanks of from 5 to 9 B.H.P. each, and a number of large motors, including those for forced draught fans totalling nearly 2,000 H.P. There are also forty-five Stone-Lloyd doors, two electrically operated whistles, searchlight, Marconi apparatus, motor for printing machines. The fittings in public rooms are of the most elaborate and massive design, a few of them costing over £100 each. The main generating plant consists of four Westinghouse turbine generating sets, each of 400 K.W. capacity, sufficient to supply 80,000 twenty-watt metal filament lamps.

AUTOMATIC FIRE ALARMS.—We are informed that the automatic fire alarms installed on the *Aquitania*, by Messrs. W. C. Martin & Co., were supplied to that firm by The Associated Fire Alarms, Ltd., of Jewin Houses, Redcross Street, London.

REVIEWS.

British Corporation Register Book for the Survey and Registry of Shipping (1914).

THE register book and rules of the British Corporation Registry recently issued, containing over 400 pages and well bound, gives a good indication of the steady growth of its operations, through the number of vessels which have been added to the Register during the past twelve months and the additions to the list of owners who have adopted its classification for their vessels. Comparison with the rules for 1913 shows a continuance of the Society's policy of maintaining the main features unchanged, but adapting details to meet experience. Evidence of this is found in the extension of the Rules for Periodical Surveys, which requires an annual inspection of hatchways, casings, ventilators and other protection to openings in the weather deck in addition to the ordinary Special Surveys at intervals of four years. The construction rules relating to these parts have also been subjected to thorough revision and have been considerably extended. These alterations should appear to shipowners and underwriters as being more directly towards greater security of life and property at sea. Several other minor modifications and amplifications have been made, which are obvious improvements, and altogether the new volume is of great interest and value to the shipping community. The Classification Rules and Tables come into force on 1st August and will supersede all other regulations previously issued by the committee.

Elementary Mathematics for Marine Engineers. By J. W. M. Sothern and R. M. Sothern. Glasgow: James Munro and Co., Ltd. Price 2/6 nett.

THIS book is an introduction to the study of mathematics and has been written specially for the use of marine engineers who may not perhaps have had the opportunity of taking classes in this subject during their earlier education. The subject has been treated from a very elementary standpoint indeed and to some much of the work may appear to have been unduly elaborated. The authors are of opinion, however, after very many years' experience in the training of engineers, that close attention to detail appears to them to be of absolute necessity, as, to the majority of men in the mercantile marine anything beyond cube foot is a sealed book. Moreover, it may be said that this work is the stepping-stone between ordinary arithmetic and mathematics proper, and in view of the growing importance attached to the education in technical training of marine engineers, there is no doubt that this book will be a very useful factor in the process of their training.

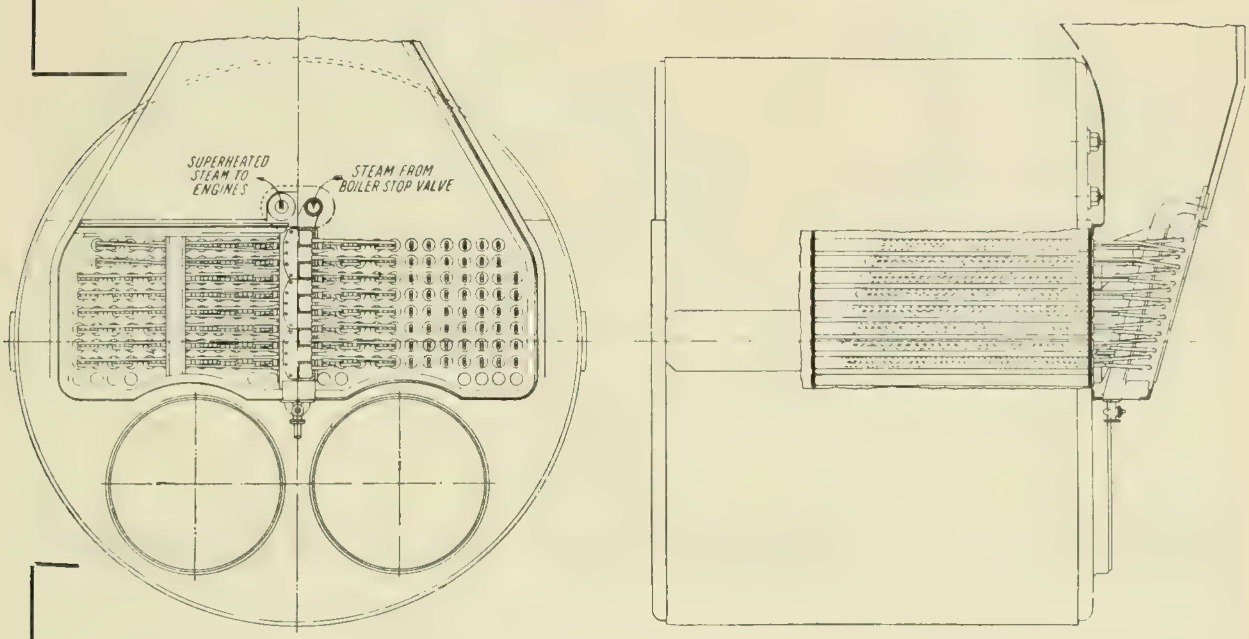
SMOOTH-ON IRON CEMENT INSTRUCTION BOOK, NO. 7, has just been issued by the well-known Smooth-On Manufacturing Co. of Jersey City, N.J. This book is devoted entirely to the use of Smooth-On Iron Cement No. 7, for hardening, waterproofing and oil-proofing concrete. Full directions are given for the work and a number of photographs of work done are shown. This valuable little book for the engineer of any manufacturing plant or concrete manufacturer, will be sent post-free if application is made to the London Offices of the Company at 8, White Street, Moorfields, E.C.

THE TRIPLEX SAFETY GLASS CO., LTD., of 1, Albemarle Street, Piccadilly, have sent us some interesting photographs showing the results of tests of their safety glass at Lord Stanhope's private range at Chevening Park. An army service rifle and ammunition (Mark VII.), were used at a range of 300 yards only. Various thicknesses of "Triplex" were fired at and while the bullets passed through the thinner substances, in the thicker sheets the bullets only penetrated one or two layers. No splintering took place and the strength of the glass as a whole was not affected. Though "Triplex" is built up of layers of glass and xylonite the difference in transparency between it and ordinary glass is hardly noticeable. "Triplex" safety glass may be used in a number of ways in ships, for example, bridge screens for destroyers and battleships, conning towers of submarines, deckhouse lights, etc.

THE "ROBINSON"

MARINE SUPERHEATER

The Latest and Most Efficient.



Reduced cost of Installation and Maintenance.

No Joints and Packing Rings requiring Constant Attention and Renewal.

Tubes Expanded Directly into Side Walls of Steam Collectors.

Interior of Steam Collector and all Parts readily accessible.

'Phone: 1762 Victoria.
Telegrams: Locosuper,
Parl, London.

The Superheater Corporation Ltd.
(Marine Department),
Palace Chambers,
Westminster, London, S.W.

The "Stone-Lloyd" System

For Controlling Watertight Doors, both Centrally and Locally, by Hydraulic Power.

44
WATERTIGHT
DOORS IN THE
"AQUITANIA"
ARE FITTED WITH
THE "STONE-LLOYD"
SYSTEM.

The only system of Hydraulic Power Control that has been tried and proved at sea—operating on more than 100 vessels.

Combines advantages of Solid Bulkheads with convenience of throughway below decks.

Permits NAVIGATION WITH CLOSED DOORS without hindering the working of the vessel.

Over 100 ships fitted.

STONE'S

Hydraulic Underline Ash Expeller

(1912 PATENT—all other Patterns rendered obsolete).

7
OF THESE MACHINES
ARE FITTED
IN THE
"AQUITANIA."

Occupies no useful space in stokehold.

No mechanically operated parts.

Noiseless—quick—clean—labour-saving.

Lightning bilge cleaner, without transit through pump (120 tons per hour).

Great emergency pumping capacity (600 tons per hour).

J. STONE & Co., LIMITED.

London Office:
Oceanic House,
Cockspur St., S.W.

Registered Office and Works:
Deptford,
London, S.E.

Industrial and Trade Notes.

THE CLYDE AND SCOTLAND.

(From our Own Correspondent.)

The Royal Visit.—The visit of King George and Queen Mary to the City of Glasgow and the industrial establishments of Clydeside occupied three days—July 7th to 10th. Only upper reach establishments were visited, and as work did not cease in the upper reaches until the 17th July, what came under Royal purview was more or less shipyards in full operation. The visit, as it chances, was paid at a time when the two yards mainly concerned—Fairfield and Dalmuir—are full of naval work and therefore full of interest to His Majesty as a Navy man. In the two establishments, and at Parkhead Forge in the east and Dumbarton on the west, principals and officials were presented to Royalty and every honour was paid to their Majesties from the highest to the lowest—the workmen evincing the heartiest loyalty everywhere. At Fairfield fine examplars of both naval and mercantile steamships were in evidence, both on the stocks and afloat in the fitting-out dock. A feature of the tour which was made of the works was the keen interest shown by the King in various parts of machinery being prepared for H.M. battleship *Valiant* at present under construction, while a model of H.M.S. *Indomitable* recalled to His Majesty his tour in Canada in 1908 when Prince of Wales. The Fairfield Company have at present on hand work which represents a tonnage of 74,500 and 210,000 horse power. The employees number 8,500 and the weekly wage bill amounts to £12,000. There were some 20,000 spectators assembled in the yard and they greeted their Majesties with much enthusiasm.

At the Naval Construction Works of Messrs. Wm. Beardmore & Co., Ltd., Dalmuir, a systematic tour of the large establishment was made under the ciceroneship of Sir William Beardmore, Bart., their Majesties visiting the boiler shops, engineering shops and power house of the works. Preceeding along the yard to the shipbuilding berths the *Ramillies*, *Royalist* and a large Italian steamer in course of construction were seen. In the fitting-out basin they saw in addition to the *Benbow*, the light armoured cruisers *Galatea* and *Inconstant* and the torpedo boat destroyer *Lennox*—the whole making a fleet in miniature which can scarcely be equalled at present in any other establishment. At the Parkhead Forge and Armament Factory, visited the day following, the Royal party witnessed several of the processes required in making the armament for the vessels seen under construction at Dalmuir the day previous and for other ships of the Navy, and among other interesting things, inspected the 5,000-ton hydraulic press engaged in forging the "A" tube of a 15-in. gun.

The shipyards between Fairfield and Dalmuir were under view of the Royal party as they passed slowly down the river on board the river steamer *Duchess of Rothesay*, and those of Messrs. Alex. Stephen & Sons, Linthouse; Barclay, Curle & Co, Whiteinch; Yarrow & Co., Scotstoun; William Simons and Co., Renfrew; and John Brown & Co., Clydebank were all points of attraction, as much because of the important ships on the stocks as of the crowds of workmen perched on every coign of vantage. On their way to the Duke of Montrose's, place, Buchanan Castle, a slight detour was made at Dumbarton and a portion of the large shipyard of Messrs. Wm. Denny Brothers passed through. Here were in evidence on the stocks four vessels, three large steamers for the merchant service and a torpedo boat destroyer, the *Legion*. Messrs. Denny, it may be convenient here to add, have just received the contract for one of the destroyer flotilla leaders, a sister ship being placed with Messrs. Cammell, Laird & Co., Birkenhead.

Messrs. Wm. Beardmore & Co., Ltd., launched from their Dalmuir establishment the day previous to the Royal visit H.M.S. *Inconstant*, the second of three light armoured cruisers the Company have on hand. The first—the *Galatea*—was launched in May, while the third, the *Royalist* is well advanced on the stocks. In the Dalmuir establishment at present there are under way new ships of all the types which make up a great fighting fleet. This comprises two of the most powerful ships of the line, three fast cruisers and a destroyer, while there are to be laid down at once two submarines. Sir William Beardmore states that at Parkhead works his Company had carried out a large number of experiments particularly with respect to their armour and the result was that they had been able to place on these light cruisers armour which was equal in resisting power to that of twenty years ago, although their weight was only a fourth or a fifth.

The Beardmore Co. at Dalmuir have now entered upon the work of constructing sea planes, their intention to do so having first been publicly intimated at the luncheon during the trial trip of the Allan liner *Alsatian* about two months ago. The announcement then made evoked keen interest on Clydeside and now that active operations have been commenced on this new branch of industry progress therein will be eagerly watched. Their first production is a waterplane which will be driven by a 120 h.p. Beardmore Austro-Daimler engine built by British labour at the Beardmore Works. It has been entered for and will in all likelihood compete in the All-British waterplane flight round Britain for a prize of £5,000 which has been timed to start from Southampton Water on 1st August.

Messrs. Caird & Co., Greenock, who at the end of June launched the P. & O. Company's *Kaiser-I-Hind*, have since booked an order from the same Company for a twin-screw steamer of 15,500 tons gross register for their India, China and Australia mail and passenger services. She will be propelled by two sets of quadruple-expansion reciprocating engines developing 18,000 h.p.

Messrs. Russell & Co., Port Glasgow, have received an order to build a steamer of about 8,000 tons deadweight carrying capacity for the Hungarian Levant Steamship Company of Buda Pesth. The Port Glasgow firm have, as usual largely contributed to the tonnage output for the past month. One of the three steamers they launched during the period was the *Minnie de Larrinaga* of 9,000 tons deadweight carrying capacity, which has the distinction of being the largest steamer ever launched by the firm. Work has been retarded in one of the two shipyards conducted by Messrs. Russell & Co. through a strike of riveters over the question of increased prices for a certain class of work. Both sides are firm and the matter in dispute is about to become the subject of a conference between the Executive Council of the Boilermakers' Society and the Shipbuilders' Federation.

Speed Trials of Notable Vessels.—Speed trials on the renowned "measured mile" stretch of the Clyde Firth off Skelmorlie have as usual, as will be gathered from our "Launches and Trial Trips" section, formed a feature of the month's doings. Brief reference to some special cases may here be made. A lengthy series of speed and engine trials were carried out with the new torpedo-boat destroyer *Laonidas* built for the British Admiralty by Messrs. Palmers', Jarrow-on-Tyne, and engined by the Parsons' Marine Steam Turbine Company. Built chiefly as an experimental ship to test the efficiency of the geared turbine as applied to the destroyer class of vessel, she is understood to have given great satisfaction. Her designed speed of 33 knots was easily attained, and while running at a speed of between 30 and 33 knots the economy in fuel was most marked. Speed trials of special interest were also carried out with the Danish ship *Bandon*, which is fitted with Diesel oil engines by the Burmeister Wain (Diesel System) Oil Engine Company, Glasgow, taking the place of the ordinary reciprocating engines fitted by her builders—Messrs. Barclay, Curle & Co—in 1909. She belongs to the East Asiatic Company of Copenhagen, the most recent additions to whose fleet have been fitted with twin-screw oil engines. These vessels proved so successful—the *Jutlandia* and the *Selandia* built by Messrs. Barclay, Curle & Co., being two of them—that the owners decided to convert other three of their fleet from reciprocating engined steamers to oil-engine vessels, and the contract for the alterations was given to Messrs. Barclay, Curle & Co. The *Bandon* is the first to be completed, and the results in her case are said to have well justified the change.

Oil-Fuel Storage at Rosyth.—Consequent upon the more general use of oil-fuel in the British Navy, the Admiralty are making oil stores an important adjunct at their dockyard at

Rosyth. They have entered into a contract for the construction of twenty large oil tanks and of an underground oil reservoir. The construction of the tanks is to be carried out by firms in the Glasgow district, the Motherwell Bridge Company and the Barrowfield Iron Works Company, ten tanks each. The foundations for the tanks and the construction of the underground reservoir will be carried out by Messrs. Easton, Gibb & Son, the contractors for the dock-yard generally. The whole of the work, which it is expected will be completed in about eighteen months from now, will involve an outlay of £200,000.

Shipbuilding at Irvine.—Irvine on the Ayrshire coast was virtually *en fête* on July 9th, the occasion being the launch of the first vessel from the enlarged shipyard there, now occupied by Messrs. Harland & Wolff, in conjunction with Messrs. Mackie & Thomson, the latter of whom some time ago vacated their yard at Govan in favour of the first named, as explained in previous issues. This first vessel from the re-constructed yard is not only the largest ever constructed on the Ayrshire coast, but is notable as being a twin-screw motor ship. She is named the *Lalinda* and is 381 ft. in length. On two of the building berths alongside that which has been vacated by the *Lalinda* are two vessels under construction even larger than she. This activity has brought about much new life and industrial stir at Irvine.

Engine Works Extension at Troon.—Since the Ailsa Shipbuilding Company began a few years ago to engine the vessels built in their shipyards at Troon and Ayr, considerable extensions to their engineering shops at Troon have been effected and a further extension is now being proceeded with, which has been rendered necessary by the increasing business of the Company. The present extension will entail the lengthening of the main building by 100 ft. and will be completed in about three months' time.

North of Scotland Trawler and Drifter Building.—Steam-trawler building continues the staple product of the shipyards of Aberdeen, and at various other North-east of Scotland fishing ports the building of steam drifters is also a flourishing industry. Motor auxiliary installations in fishing craft are also of course a feature. Messrs. Hall, Russell & Co. and A. Hall & Co., Aberdeen, continue to be very well employed. The first-named firm launch three and sometimes four trawlers at a time from the same ways. Messrs. Scott & Yule, Frazerburgh are very actively engaged building steam drifters, the engines for which are made in Aberdeen. Indeed at Frazerburgh and Sandhaven there has been for some months quite a boom in the building of this class of vessel. Messrs. Scott and Yule have lately had to decline a goodly number of orders and Messrs. J. & G. Forbes at Sandhaven, it is stated, have refused this year no fewer than thirty-five orders.

THE TYNE AND WEAR.

(*From our Own Correspondent.*)

The Tyne.

THERE has been a very pleasant break in the strenuous life of this important shipbuilding and engineering centre. The summer meeting of the Institution of Naval Architects, the Institution of Engineers and Shipbuilders in Scotland and of members of the North-East Coast Institution of Engineers and Shipbuilders drew in the second week of the month the principal men engaged in these kindred industries from all over the kingdom. For four days Newcastle was the centre of their deliberations, varied by pleasant excursions to picturesque spots in Northumberland and to the great shipbuilding yards and marine engineering workshops. The members of the North-East Coast Institution were really in the capacity of hosts and they united in a stern endeavour to acquit themselves worthily of that responsibility in a fashion which would show no shortcomings as compared with other parts of England, where the Conference has gathered. More than that, the municipality of Newcastle undertook the duty of welcoming its distinguished guests and hastened not only to make them welcome, but to do all it could to secure their happiness while they remained within the borders of the city. The Lord Mayor and Lady Mayoress were lavish in the hospitality they extended to the visitors, and invited large numbers of representative citizens to meet them at a reception in Tilley's Rooms and at a garden party held within the charming vale of Jesmond Dene, which was originally handed over to the city by the late Lord Armstrong, who bought this extensive and spacious valley, built a girder bridge over it, which he presented to the town and afterwards handed over the whole place with its fine banqueting hall for the use of citizens, after Lady Armstrong had ingeniously planted the valley on a scale of landscape gardening without equal in this country. In this sheltered vale plants of tropical growth flourish freely and art has improved on nature most deceptively. The hospitality extended to the visitors did not cease here. The Earl of Durham invited all the members out to a garden party at Lambton Castle, at which he welcomed the guests in company with his sister, Lady Anne Lambton.

There is so much naval work in progress and on the books on the Tyne that I do not find much anxiety in other quarters on the subject of commercial orders. The burden of work for the Admiralty is greater than has been experienced at any other period on the river. The only difficulty experienced is in the supply of labour. There is no unemployment. More men cannot be had. The departure of the *Osman I.* on her maiden voyage in the early part of the month made conditions more favourable for the Elswick firm to secure more men for the work they have in hand at their new yard. It is almost completed. The yard will, when it is finished, possess nine building berths, the largest of which will take any class of vessel up to 1,000 ft. in length and almost any beam, and that will remove the serious problem the firm and the Tyne Commissioners have jointly had to face every time one of the great warships has to be brought down through the narrow opening of the High Level and Swing Bridges, built in days when the modern size of vessels was a thing never anticipated. The smallest berth at this yard will take a vessel up to 500 ft. in length. Three of the berths have been specially strengthened by ferro-concrete pilings and foundations for the building of the heaviest war or mercantile vessels yet contemplated. There is a river frontage of nearly a mile. The task of building this yard may be calculated when it is known that for the greater part of its area the ground has been cut away and excavated. It was all hills of ballast which had accumulated through centuries in the days when vessels came in earthen ballast and took back coal and other products of the North. Over 2,000,000 tons of shipbuilding could be built simultaneously at this yard were there labour and material enough available. The erection of the yard in this respect introduces a new problem. The housing of the workers is a matter the local authorities have to tackle. Steps are being taken by syndicates to erect houses under town-planning regulations. The chief men concerned in the project have also big interests in the shipbuilding work on the river.

The *Malaya* is being built at this yard, and now Messrs. Armstrong, Whitworth & Co. have secured an order for a still larger Dreadnought to replace this boat for the Brazils. The new vessel it is understood, will create another record in size of shipbuilding for the river. The keel is to be laid alongside the Malay Federal State gift for the British Navy. The Brazils have also ordered two scouts and as the firm have also in hand the work announced last month for the Turkish Government, it will be seen there is not likely to be any slackness for a long time to come.

Messrs. Palmers, of Jarrow, have begun their second war vessel for the British Navy. Good progress is being made with the battleship *Resolution.*

The Wear.

July has not been a month with any notable additions to the vessels on the stocks on the Wear. I am assured that there is no scarcity of work in any of the yards at Southwick or Pallion. Fortunately there has been an entire absence even of minor labour troubles. Though it is true that shipowners are not yet sure of anything but a continued run of low freights, there is a certain amount of confidence shown in enquiries for new bottoms, but negotiations for several fresh contracts are awaiting a prospective lowering in the price of material. The slightest drop in the cost of plates will, I am told, result in the placing of several new orders on the Wear.

THE TEES AND HARTLEPOOLS.

(From our Own Correspondent.)

Middlesbrough.

SEVERAL orders have been placed during July.

Messrs. Sir Raylton Dixon & Co., Cleveland Dockyard, have secured the contract to build a large meat boat for Messrs. Furness-Houlder Argentine Lines, Ltd., about 420 ft. long, similar to the contract placed last month with Messrs. Earle's, Hull; also a passenger steamer for Messrs. M. Langlands & Co., Liverpool and Glasgow, 240 ft. long, 34 ft. 9 in. beam, 17 ft. deep, both for delivery next year.

Messrs. Richardsons, Westgarth & Co., Ltd., are to supply the engines and boilers, of about 6,000 h.p., for the twin-screw meat boat to be built by Messrs. Sir Raylton Dixon and Co., and also have an order for five very large marine boilers.

Messrs. W. Harkess & Sons, Ltd.—No new orders are reported during the month, but they are likely to secure the order for a small steamer that is in the market.

Messrs. Smith's Dry Dock Co., South Bank, have secured further orders for drifters, also a 180-ft. trawler for French owners. They are very busy dry-docking and overhauling steamers.

Mr. T. C. Stevens, of Edinburgh, is establishing a tri-weekly cargo service between this port, Newcastle, Grangemouth and Nantes.

Stockton and Thornaby.

Messrs. Craig, Taylor & Co.—No orders are reported during the month, but further particulars are to hand of the steamer reported last month to be built to the order of Messrs. Crosby, Kerr & Co., Liverpool, for Greek owners. She will be 390 ft. long, 50 ft. beam, 25 ft. 8 in. depth moulded, to carry about 7,500 tons deadweight on 22 ft. 6 in. draught, to steam 10 knots, contract price about £48,500.

Messrs. Richardson, Duck & Co., have secured the contract to build a cargo steamer of about 4,000 tons deadweight for Cardiff owners, also a cargo steamer of about 8,000 tons deadweight for Messrs. Haldenstein & Co. (managers of the Court Line, Ltd.), also a large steamer for Messrs. Bowring and Co., Liverpool, a sister-ship to one recently placed by them with Messrs. Short Bros., Pallion, Sunderland.

Messrs. R. Ropner & Sons have secured the contract to build a cargo steamer to the order of Messrs. Constantine, Pickering & Co., Middlesbrough, which will keep them busy into next year.

Messrs. Blair & Co. have secured contracts to supply the engines and boilers for the steamer to be built by Messrs. Craig, Taylor & Co., for Messrs. Crosby, Kerr & Co., the boilers of which will be two single-ended, 17 ft. diameter, 11 ft. long, 180 lbs. working pressure; Messrs. Haldenstein's boat to be built by Messrs. Richardson, Duck & Co., and Messrs. Constantine, Pickering's boat to be built by Messrs. R. Ropner & Sons.

West Hartlepool.

Messrs. W. Gray & Co. are very busy at both the old and new yards, but no new orders are reported during the month.

Messrs. Furness, Withy & Co. have sold the s.s. *Almeriana* (ex *Catania*, ex *Echuca*) to Messrs. T. W. Ward & Co., Sheffield, through Messrs. H. E. Moss & Co., Liverpool, for £3,500, for breaking up.

Messrs. Furness & Houlder have formed a new company with a capital of £1,000,000, to build five twin-screw meat boats for the London-Argentine meat trade. One boat each will be built by Messrs. Earle & Co., Hull, Messrs. Sir Raylton Dixon & Co., Middlesbrough, Messrs. Irvine's Shipbuilding and Dry Dock Co., Hartlepool, Messrs. Palmer's Co., Jarrow-on-Tyne, and Messrs. A. Stephens & Co., Glasgow.

Messrs. Irvine's Shipbuilding & Dry Dock Co., Harbour Dockyard.—No new orders are reported during the month, but the Company have a great amount of work on hand.

The Central Marine Engine Works of Messrs. W. Gray & Co. are working double shift to supply the engines and boilers for all the steamers building by this firm. Great progress is being made with the extension to the works.

Hartlepool.

The Port and Harbour Commissioners have placed an order with Messrs. J. T. Eltringham & Co., Willington Quay, to build the hull and machinery for a large steam hopper.

Messrs. Irvine's Shipbuilding & Dry Dock Co., Ltd.—During the month they have secured the contract to build one of the five twin-screw meat boats to the order of the Furness-Houlder combine, to steam 14 knots, with delivery in twelve months.

Messrs. Richardsons, Westgarth & Co., Ltd., have a record order sheet. They will supply the twin-screw engine and boilers for Messrs. Irvine's meat boat, and, in addition, have orders for several large condensing plant installations.

HUMBER NOTES.

(From our Own Correspondent.)

Hull Docks and Riverside Quay.—This month the docks have not been so busy as regards vessels with pit props. The men who generally work on these steamers came out on strike, but this has now been settled, and the vessels have gone to Northern ports. A fair amount of tonnage arrived from Eastern and Plate ports and the Colonies, with meat, wool, etc. The coal trade has been fairly brisk, and a number of vessels came from the Continent and loaded coal for the Baltic and South American ports. The passenger vessels for the Continent, Norway and Sweden are fairly patronized.

Marine Engineers' Strike.—The sea-going engineers in the Humber ports seem to be alive to the fact that other engineers are being brought into the port to fill vacancies that occur in the tramp steamers. At the time of writing there is some talk of taking all sea-going engineers out of their ships if this goes on. It is to be hoped that, before anything is done to spoil the trade of the country some amicable settlement will be arrived at between the engineers and the owners of the tramp steamers.

Messrs. Earle's Shipbuilding & Engineering Co., Ltd.—It has been announced that this Company has been successful in securing an order for a large liner to build for the Furness-Houlder Company.

Messrs. Amos & Smith, Ltd., report that they have orders sufficient to carry forward to 1916. The work consists of engines and boilers for trawlers, and they have to keep their machines going night and day.

Messrs. C. D. Holmes, Ltd., are working at full pressure night and day with all their machines to compete with orders that the firm have in hand. They are booked up to 1916. The boiler shop turned out eight large boilers last month, some of them 14 ft. by 10 ft. 9 in. This shop is complete with all up-to-date tools.

Messrs. Cooper & Co., Ltd., have had an exceedingly busy month in the several docks, also the usual engine and deck repairs, and opening out boilers and engines for surveys. The moulding shop is fairly employed with orders from local engine builders and with the firm's patent propellers for home and foreign exports. Their own graving dock in the old harbour is well booked up for the next three weeks.

Messrs. Stewart & Craig, engineers and ship repairers, have been fairly busy during the month effecting the usual engine-room, stokehold and deck repairs, on the following steamers:—s.s. *Bazarilla*, s.s. *Rostock*, s.s. *Haga*, s.s. *Grovel*, s.s. *Lapponia*, s.s. *Dunolly* and others.

Messrs. North-East Coast Engineering Works (Hull), Ltd., have done work on the following steamers:—R.M.S. *Parana*, heavy repairs to boilers, engines, deck and insulation work in holds; s.s. *Edith*, new deck plates and shell plates, new bunkers and hatches, frames and keelson, etc.; s.s. *Bellas* engine, boiler and deck repairs; s.s. *Gretavale*, lifeboat, boiler and deck repairs; s.s. *Spica* and tug *Finlay*, engine and deck repairs, etc.

Messrs. Central Dry Dock & Engineering Co., Ltd., have effected a number of repairs, *viz.*:—s.s. *Gunel*, very extensive repairs on bottom; s.s. *Algebhi*, survey and also heavy repairs; s.s. *Dunraven*, graving dock repairs and drawing tail-shaft; s.s. *Utgard*, very extensive repairs to bottom, owing to vessel having been ashore; s.s. *Luno*, extensive repairs, bottom damage. The following local steamers have also been in dry dock undergoing repairs:—s.s. *Atlantic* s.s. *Gothic*, s.s. *Asiatic*, s.s. *Athenic*, etc.

Messrs. Woodall & Co., engineers, etc., have been busy on the following steamers :—s.s. *Alber W. Selmar*, repairs to winches, etc. ; s.s. *Fanny*, tank and deck repairs ; s.s. *San Andreas*, general heavy and extensive repairs ; s.s. *Kron Prinz Agusta Adolf*, general repairs ; s.s. *Verner*, s.s. *Mary*, s.s. *Oltara*, usual engine and deck repairs.

Thomas Tate, engineer, has done a fair amount of repair work on coasting steamers and tug boats and graving dock work.

Messrs. Cochrane & Son, Ltd., have at Hull six vessels fitting out, preparing for trial trips, before handing over to their respective owners. The yard has work in hand up to May, 1916.

H. Scarr, shipbuilder, Hessle, has a number of steam barges in hand for local owners, and will be launching in a few days a very large barge.

Messrs. Livingstone & Cooper, Ltd.—Since our last issue this Company has launched a drifter called the *Jack Salmon*, for the Yarmouth Steam Drifters Co., Ltd. She is a very nice vessel, and built greatly in excess of Lloyd's requirements. She received her boiler in Hull, and was towed to Yarmouth to receive her engines from Messrs. Crabtree & Co., Ltd. The third vessel, of similar dimensions, will be launched in a few days. The Company is busy building trawlers for local owners, and the prospects seem very good. They are now in a position to give quick delivery for vessels up to 250 feet.

Trawler towed 800 miles.—The Hull steam trawler *Princess Louise*, which was sunk during a hurricane off the coast of Trondhjeim, Norway, last December, and immersed for six months, has been towed to Hull. The hull was covered with a thick rust, and inside the vessel the effect of six months' immersion in the sea was plainly to be seen. The wood in the cabins had rotted and broken down, most of the thinner iron plates had turned completely into rust, and heaps of seaweed and other sea growths were strewn about. The engine-room presented the worst spectacle of all ; instead of its usual brightness, the steel work was quite red with rust ; the kettle in the mess-room was still on the range, but even that was crumbling away. The vessel was towed by the tug *Hullman*, belonging to Messrs. T. Gray & Co., Ltd., Hull, from Trondhjeim to Hull, roughly 800 miles.

SOUTH OF ENGLAND AND ISLE OF WIGHT.

(*From our Own Correspondent.*)

THREE hundred men, the crew of the R.M.S.P. *Andes*, walked ashore from the vessel at ten o'clock on Friday morning, the 17th of last month. The vessel was due to sail at 12 noon the same day. The cause of the crew's action was due to the presence of a non-unionist among their number. The situation had been developing since the previous Tuesday, which is the usual day for "signing on." The stokehold and deck staffs did sign on that day, but the stewards refused, when the stores inspector would not join the Union. The signing on was postponed till Wednesday, and then till Thursday. In the meantime it is reported the man informed the Union that he would not sail in the *Andes*, and accordingly all the stewards "signed." It then transpired that the man had actually signed, consequently all the crew left the vessel. A hurried meeting was held between the officials of the Company, and the man to whom objection was raised, said he would not sail and his position was filled. The men immediately returned to the ship, the "strike" having lasted about two hours. The *Andes* sailed promptly at noon.

The *Kaiser Wilhelm II.*, which has been repaired here by Messrs. Harland & Wolff, took up her place on the N.D.L. Co.'s sailing list on the 29th of last month. The dock was urgently required for the *Olympic* and Messrs. Harland and Wolff were working at full pressure to finish the German vessel in time. It will be remembered that the *Kaiser Wilhelm II.* was in collision with the s.s. *Incemore* on the 17th of June last. At the Admiralty Court held on the 17th of last month Justice Bargrave Deane found in favour of the German vessel. She received a heavy right-angle blow just forward of the third funnel, and the cost of repair was estimated at £30,000. The *Incemore's* bows were bent over to starboard by the *Kaiser Wilhelm's* speed, but her own movement caused the setting back of both bows to the extent of about seven feet. "My own opinion," said his Lordship—"and the Elder Brethren agree with me—is that as far as the *Kaiser Wilhelm* is concerned, at or about the time of the collision, or immediately before it, no blame can be attached to her for her manœuvres. Proper precautions were not taken on the *Incemore* to ascertain conclusively whether she had speed through the water."

Messrs. J. I. Thornycroft & Co., Ltd., Southampton.—On the 8th of last month the second of the two twin-screw tugs for the Argentine Navy was successfully launched by Senorita Maria Lia Parfitt, daughter of the resident overseer for the Argentine Naval Commission. The vessels are 130 ft. between perpendiculars ; breadth, moulded, 28 ft. ; depth, 13 ft. 11 in., and draught, 12 ft. 6 in. There are two sets of triple-expansion engines with cylinders 13½ in., 22 in. and 35 in., with a stroke of 27 in. Steam is supplied by two Scotch single-ended boilers 13 ft. 6 in. diameter by 11 ft. long. Electric light is fitted throughout, and a searchlight is mounted on the foremast. The vessels are primarily intended for the towage of the battleships of the Argentine Navy.

Messrs. Day, Summers & Co., Ltd., Northam, Southampton.—The s.s. *Teign*, the third vessel for the Royal Mail Steam Packet Company's intercolonial service, was successfully launched on the 9th of July. The firm have booked an order for a new tug-boat for the Isle of Wight Company similar to the *Hector* and *Neptune*, which they built for this Company some time ago.

THAMES.

(*From our Own Correspondent.*)

The Port of London.—The large graving dock at the Royal Albert Dock has been brought into use by the admission of the Cunard liner *Alaunia* of 13,405 tons gross. The new dry dock is 166 ft. longer and 15 ft. wider than the one that previously occupied the site, the actual dimensions being 575 ft. long and width of entrance 80 ft. When the new dry dock at the Albert Docks extension is opened in about two years, the P. L. A. will have six graving docks of their own. In the meantime this new dry dock will materially add to the resources of the P. L. A. in this branch of their business.

St. Paul's Bridge.—The design of this new structure over the Thames has been awarded to Mr. Geo. Washington Browne. There is some resemblance, we understand, to Waterloo Bridge. Stone or granite is suggested for the river span, but over Queen Victoria Street and Upper Thames Street metal will be employed. The bridge House Estates Committee notify however, that the acceptance of this or any other design depends on the cost involved. All the competitors have been inspired with the idea of simple strength and austere finance, but it has to be remembered that the cost will not be so much on the bridge itself as on the demolition of buildings involved.

The London Steamboats.—The Company operating these boats has had to give in so far as the Greenwich part of the service is concerned. The complaint is against the pier dues exacted by the London County Council, working out at about 15 per cent. of the Company's total takings. The vessels withdrawn are put into the up-river service to Kew, where the piers are Port of London ones and less rates are charged. The Company has been operating the service since 1909, when they took it over from the Council.

Training Ship "Warspite."—The annual inspection of this vessel has been made by the Earl of Shaftesbury. A party of guests was taken down to Greenhithe by the *Belle of Southend*, and the prizes were presented by Lady Shaftesbury. The chairman of the Marine Society, Admiral Sir L. A. Beaumont, the vice-chairman, Mr. Kemp-Welch, and the superintendent received the guests, who included Capt. Acton Blake, Deputy Master of Trinity House, and the chairman had a very satisfactory report to make respecting the vessel during the year. The entries into the Navy and mercantile marine have been numerous.

MERSEY AND MANCHESTER SHIP CANAL.

(From our Own Correspondent.)

LIVERPOOL at the time of writing is once again under the spell of the strike epidemic. For some time, paid organizers have been at work seeking to place the Mersey Dock and Harbour Board's employees upon the same basis as other workers of the port. The position of the Board's employees, due to various special privileges, is such that it is not considered desirable or compatible with the gigantic corporation's special functions of almost national importance, that such a state of affairs as has now been aimed at, might be at any future time propagated at the instigation of Union leaders. So far no serious stoppage of or interference with the work of the Port has taken place, whilst the men are showing signs of regret at the step taken, a good number having returned to work.

Messrs. Cammell, Laird & Co.—Much satisfaction is felt locally that an order for one of the four special destroyers has been placed by the British Admiralty with this firm. Together with the machinery for the light cruiser *Cleopatra*, also the hull and machinery for the *Caroline*, this yard will be now fairly well employed with work for the Admiralty. It is understood that the *Kalyan*, the last of four large intermediate steamers for the P. & O. Co. will be launched towards the end of August. We regret to state that valuable cabin and saloon fittings intended for this vessel and also for the Argentine steamer *Cuidad de Buenos Aires*, were destroyed by fire on June 24th, when the joiners' store was completely destroyed. On this occasion the firm's employees rendered valuable aid to the Birkenhead Fire Brigade.

By the retirement into private life of Mr. John Cookson, late head of the outside work of the repair department, Messrs. Cammell, Laird & Co. have lost one of their most consistently faithful servants; a man at once a gentleman and a thorough engineer, quiet, yet firm, and a strict diciplinarian, one of many staunch souls who serve their firm, their day and generation faithfully, and who's life work thereby is built into and knit into such fame as must be associated with firms such as that of Messrs. Cammell, Laird & Co.

Mr. J. Hamilton Gibson, his erstwhile chief, in a few touching words of tribute, reminded those gathered to witness the presentation of an illuminated address, gold watch and silver tea service, that during some of the strenuous times in the past, when there was trouble abroad, Mr. Cookson was omniscient; it was "Cookson here, there and everywhere." Mrs. Carter graciously made the presentation, whilst Mr. G. J. Carter, managing director, responded on behalf of his wife, and in conveying to Mr. Cookson the affectionate regard of his associates, voiced the sentiments of those many friends who so well knew his sterling worth.

On July 1st, the Birkenhead Chamber of Commerce and various Railway officials made an inspection of the Large Train Ferry now completed at this firm's works. This vessel which is 326 ft. long, 65 ft. beam and with a draught of 15 ft. has been constructed for the Trans-continental Railway Co. of Canada, for service between Quebec and Point St. Levis.

The Liverpool Engineering & Condenser Co.—Amongst a large amount of work on hand, this firm have the Evaporating and distilling machinery for the super-Dreadnought *Repulse*, similar machinery for the 30,000 S.H.P. cruisers *Cordelia*, *Carysfort* and *Calliope*, whilst complete plants have recently been supplied for the *Llewellyn* and *Lennox* of the "L." class of British destroyers.

Manchester Ship Canal.—The latest addition to the works upon the Canal is a large modern brewery for Messrs. Guinness and Sons, the famous Dublin brewery firm. The necessary details have now been completed and operations are to be pushed forward as rapidly as possible. A Manchester firm are also erecting a molassine factory at Trafford Park.

The Bibby Line.—Still another large steamship Company has adopted the cruiser stern. Following the recent lead of the C.P.R., Allan Line, etc., Messrs. Harland & Wolff have recently been commissioned to construct a large liner of the cruiser stern type, to the order of Messrs. Bibby Bros. These owners' vessels being amongst the largest in the Rangoon and Mersey trade, will be the pioneers of the cruiser stern in the former district.

The City Line.—The latest addition to the Fleet of Sir John Ellerman, the *City of Exeter*, started upon her maiden voyage to Calcutta on June 30th from Liverpool. The same distinctive feature as the above prospective vessel, *viz.*, the cruiser stern lends to her especial interest. This vessel which is fitted up in the most lavish style for the Indian Passenger trade has a length of 502 ft. with a beam of 58 ft. 6 in., and a depth of 35 ft. 4 ins., her gross tonnage being 9,373.

Canada and the Panama Canal.—It is already understood that the Canadian Northern and Grand Trunk Companies are to establish lines of steamers between the Eastern and Western seaboards, *via* this Canal. A resolution has been passed by the Quebec Board of Trade, urging upon the Canadian government in view of the approaching opening of the Panama Waterway, that a line of steamers should be subsidised between the Maritime Provinces and British Columbia, with a view to the cheapening of transportation.

Empress of Ireland Collision.—The *Storstad*, the vessel which recently so fatefully and tragically collided with the *Empress of Ireland*, has been sold in the Admiralty Court at Montreal for $175,000 (dollars), the purchasers being the Prudential Trust Co., acting, it is stated, for foreign owners, reported to be her original owners, The Maritime Steamship Co. of Norway. She was afterwards expected to proceed to Davis Dry Dock at Quebec for repairs.

Capt. Kendall on July 9th reached Liverpool on board the Allan Liner, *Alsatian*. Accompanied by his wife, he was welcomed by his children and many leading C. P. R. officials. Amongst the *Alsatian's* passengers were Mr. Butler Aspinall, K.C., leading counsel for the C. P. R. at the enquiry, Chief officer E. C. Jones and Mr. A. Hurst, of Birmingham, a survivor.

Distinction for Liverpool Shipmaster.—Capt. G. L. Porter has been selected as navigating master for *Shamrock IV.*, from this country to New York and also to sail the famous yacht home after victory has, it is hoped, been achieved. Capt. Porter is the late master of the steamer, *Hoyle Bank*, recently sold out of the fleet of Messrs. Stewart & Esplen, of Liverpool.

Death of a well-known Shipowner.— In the death of Mr. John Dempster, which occurred at Noctorium ,Cheshire, on July 19th, Liverpool has lost one if its leading names in the shipping calendar. One of the retired members of the firm of Elder, Dempster & Co., he began business on his own account with Mr. Elder in 1868 under the title of the African Steam Navigation Co., for which Company they were appointed Liverpool managers, the chief shareholders being Glasgow people. Mr. Alfred Jones (afterwards made Sir Alfred), also Mr. Davey joined the Company in 1879. Messrs. Elder & Dempster retired in 1884, but remained managing directors until the Company was absorbed in the new Company of Messrs Elder, Dempster & Co. Mr. Dempster, who was 77 years of age, was also a director of the West India and Pacific Steam Navigation Co., also an auditor of the Royal Insurance Company. A staunch Presbyterian of a reserved and sympathetic disposition he was much respected and admired by those who knew him best. He leaves four daughters and two sons, besides a number of grandchildren.

Midnight Yacht Race.—The Eighth Annual Yacht Race from Liverpool to the Isle of Man was held on Saturday, July 4th, in calm fine weather. An unusual occurrence took place, the smallest boat in the contest being the winner. The race was won by the cutter *Yvonne*, owned by Mr. S. Hazelwood, of Manchester, who, along with two other amateurs composed the cutter's crew.

NORTH-WEST OF ENGLAND.

(From our Own Correspondent.)

Barrow-in-Furness.- July has probably been one of the most strenuous months ever experienced in shipbuilding circles in Barrow since this great industry was first established in that town, and there is a great desire to complete the Turkish battleship *Reshadieh* by the third week in August, when she will go out of dock to take her trials and then will proceed to the Near East to form part of the new Ottoman Navy. It is certain that about 3,000 men are now engaged on the ship in fitting up all classes of details, and it will be found that when the ship is finished, and comprising as many improvements as she does, she will be one of the most formidable vessels afloat. When the work has been done on the

Reshadieh similar work will have to be proceeded with on the British battleship *Emperor of India*, which is lying alongside of her in the Buccleuch Dock. This vessel is expected to be ready for delivery at the end of the year, and then her place will be taken by H.M.S. *Revenge*, which is being built in the shipyard in Walney Channel. There is a great deal more work to be done on a battleship after she is launched than before that event, and the innumerable classes of fittings required in the modern warship to make her a complete fighting machine seem to grow with each succeeding vessel launched.

Work in Progress.—Messrs. Vickers, Ltd., have a deal of work in progress in their shipbuilding yard, as they have two very large line-of-battle ships on the stocks, one for the British Admiralty and another for the Ottoman Government, on which work is proceeding very satisfactorily, but the directors of the firm have determined to speed up the process of building ships by the utilization of means for that purpose which will facilitate work. They have just completed the erection of nine tower cranes which are built on each side of the slipways, and which for convenience in working enable work to proceed much more quickly and much more economically than was possible previously with the old Brown's cranes. Other arrangements are in progress which will also help to push forward the work of erecting vessels. The two light cruisers for the British Admiralty are making signs of being ready soon for launching. The *Penelope*, it is expected, will be launched in September, and it is hoped the *Phaeton* will be launched a month or two after she has taken the water. These vessels when launched will be fitted up at the Devonshire Dock berth, as they are able to get through the Devonshire Dock passage way. For some time past not much work has been done at this berth, as the big and broad battleships cannot get through into the Devonshire Dock. There will also soon be launched the oil-tank oil-driven steamer *Olympia*, which is to be used to carry oil fuel to ships of war out at sea. Her oil engines have been sutisfactorily tested for some time, and there is every reason to anticipate they will work with very great satisfaction and economy when placed on board ship. The construction of the new section for the Brazilian floating dock at Rio de Janeiro is proceeding very satisfactorily and later on in the year she will be launched.

Submarines.—The submarine department in the Barrow shipyard has now become a very important branch of the Company's business. It is crowded with orders, and although it has lately been considerably extended it is quite full of work. Lately some very large orders for submarines have been received from the British Admiralty, together with orders from the Australian Government in succession to the order just completed for two submarines which have made their way to Sydney by means of their own power. These vessels have given great satisfaction to the Australian Government, and the ordering of a still further number shows their confidence in the utility of this new feature of power in any future wars which may arise. Some submarines have also to be built for Turkey. Thus the Barrow shipyard is expected to be very busy for some time to come. There was launched during the month another submarine of the "E" class, which possesses many improvements not contained in previous submarines of this class. The vessel is driven by two heavy oil engines, each capable of 800 horse power, and she will sail afloat at 20 knots per hour and about half that speed submerged. She is fitted with a quick-firing disappearing gun, and with wireless telegraphy. Great attention is being devoted to a most marvellous departure in submarine construction in the building of a very large submarine, which will beat all previous records as to capability of power in doing the maximum amount of damage to an enemy in war time. She will be ready for launching in the course of a short time. She will have a displacement of 1,800 tons, and is expected to open up quite a revolution in submarine construction.

Airships.—The new shed which has been built by the Vickers' firm for the purpose of building airships of various classes has now been practically completed, and before long the work of constructing airships will be commenced. The shed is a very large one, and there is plenty of room to add further sheds if needed in the development of this interesting business. The firm have already orders in hand for three "Parsevals" and one rigid airship for the Admiralty, and there is reason to believe they will be able to get a succession of orders when they once start the business, as it is known the Admiralty have decided to add very materially to the number of aircraft now possessed by the country. There is indeed every prospect of airship building becoming a very important branch of Vickers' enterprise at Barrow.

Engineering.—The engineering shops of Messrs. Vickers, Ltd., are very busily employed in all departments, and a very large number of orders are held. This remark applies not only to the marine engineering department but also to the gun-mounting branch, which is very thronged with work. There are evidences that a long spell of activity is before the firm in engineering.

BELFAST.

(*From our Own Correspondent.*)

On the evening of 10th July the Belfast yards closed for the annual "Twelfth" holidays, which usually last about ten days. Within a few days of shutting down three vessels—referred to below—having an aggregate of 56,500 gross tonnage were launched.

Messrs. Harland & Wolff, Ltd.—The most important launch of the month was that of the Holland-Amerika liner *Statendam* from the north end of the Queen's Island on 9th July. The latest addition to the big Dutch line is 764 ft. long and 33,000 gross tonnage, and she will be driven by "Combination" machinery, consisting of two sets of reciprocating engines and a low-pressure turbine. Two days previous Messrs. Harland and Wolff launched, from the south end of their yard, another magnificent triple-screw steamer. This was the *Orbita*, built to the order of the Royal Mail Steam Packet Co. She is 569 ft. long and has a gross tonnage of 15,000.

The question of demarcation of trades is one that in the past has frequently given rise to disputes and strikes of a more or less serious nature, and an important agreement was recently arrived at between Messrs. Harland & Wolff and the various Trades Unions concerned. The intention of the new arrangement, which it is stated will come into force after the July holidays, is that in case of a dispute over the alleged encroachment by one trade on another, the matter shall be amicably settled without a stoppage of work. A conference was held last February between delegates of the Trades Unions and Messrs. Harland & Wolff's representatives, and the outcome of the deliberations is that the local Board of Trade surveyors are to act as referees when any question arises in connection with a claim regarding demarcation of work. The appointed referee will take the evidence of each of the societies concerned, and if a settlement cannot be arrived at by mutual consent, he will give his decision, which will be binding on both parties. It is to be hoped that the scheme, which is bound to receive the hearty approval of every right-thinking man, will meet with the success which it deserves, for it is most unfair that employers should suffer through a strike simply because two Trades Unions disagree as to who shall do certain work, and from the men's point of view it will be much more satisfactory to have a dispute settled without the loss of wages which a strike necessitates. It is gratifying to note that the representatives of all the trades allied in shipbuilding have expressed their approval of the new arrangement.

Messrs. Workman, Clark & Co., Ltd.—On July 6th this firm launched another addition to the fleet of the Royal Mail Steam Packet Co. The new vessel, which is named *Essequibo*, is twin-screw, and has a length of 467 ft. with gross tonnage of 8,500.

The Harbour.—The Dutch contractors who have the Harbour Commissioners' various dredging works in hand have made rapid progress with their work, and the entire area of Messrs. Harland & Wolff's new 15-acre intake in rear of their engine works has now been filled in with dredgings. Messrs. Harland & Wolff have almost completed the closing in of the space, and a new pattern shop has already been erected on a portion of the reclaimed ground. Reference was made in the September issue of last year of The Marine Engineer to the agreement entered into between the Harbour Commissioners and Messrs. Harland & Wolff, whereby Lord Pirrie took up £60,000 worth of Harbour Stock in consideration of the Commissioners undertaking the construction of a deep-water wharf 1,000 ft. long at the East Twin Island, and it was then pointed out in these notes that in all probability another fitting-out wharf would be constructed at the south end of the Musgrave Channel on similar terms. Messrs. Harland & Wolff have now taken up further stock to the extent of £36,000 to meet the necessary expenditure, and plans and specifications are being issued to tenderers for a reinforced concrete wharf 550 ft. long, and alternatively for the construction in timber. These big undertakings on the part of the Belfast Harbour Commissioners afford a striking indication of ever-increasing prosperity of the shipbuilding trade on the Lagan.

THE BRISTOL CHANNEL.

(*From our Own Correspondent.*)

Cardiff, Barry and Newport.

THE ship-repairing establishments of the Bristol Channel were, with a few exceptions, rather quietly engaged during the past month, a fact which may partly be accounted for by reason of the sympathetic strike of fitters engaged in these establishments. Although only a sectional stoppage in the work of the dry docks occurred yet the effect is felt by other branches of labour more or less dependent on the presence of the fitters. Without entering into the merits or demerits of the present agitation, it must be generally deplored that the reaction on the repairing trade in this district has been in evidence during the month. Since the shore fitters decided to act in sympathy with their sea-going brethren a number of repair jobs have been deflected to Continental establishments, much to the foreigner's material benefit and our corresponding loss. At the present time the Continental firms are keen competitors for work with the British firms and it may quite reasonably be assumed that a proportion of the overhaul work which now finds its way to their establishments may be permanently secured by them. It is in this way that sectional disputes invariably exercise a far-reaching effect, which in many instances becomes more or less permanent. An early settlement would, therefore, be welcomed, both by those directly affected and those who have the general welfare of the district in mind, and it is to be regretted that at the time of writing these notes no prospect of an early settlement seems imminent.

Mountstuart Dry Docks, Ltd.—This enterprising concern, as usual, continued to be well employed during the month and the amount of business secured by this firm has attracted general attention in shipping circles. The absolutely modern character of the excellently-arranged equipment possessed by the Company and the rapid despatch given to repair work by its use, is strikingly telling its own tale. Amongst the work executed were the heavy repairs to the steamer *Astarte*, caused by ice damage; a stern-frame job on the *Rowena*, extensive damage repairs on the *Italiana*, as well as general repairs on the *Mobile, Maywood, Rio Pirahy, Flawyl, Atlantic City, Glenspean, Rugbeian, Lincolnshire*, etc.

Channel Dry Docks and Pontoon Co. and its various associated concerns in Cardiff and the neighbouring ports were also well engaged during the month on general repairs, amongst the jobs dealt with being repairs on the steamers *Servian, Auguszta Foherczegno, England, Natal Transport*, and heavy repairs to the *Jane Radcliffe*.

Messrs. Shearman were among the fortunate firms to be busily engaged, and were successful in securing a large share of the available work, which was put into execution at their establishments at Cardiff, Barry and Newport. The activity which characterized the operations of this firm may be gauged by the following list of steamers to which general repairs were made—*Ocean Transport, Lucadia, Stella, Valentia, Dagfred, British Monarch, Enosis, Farringford, Relentless, Lady Belle, Konakry, Cornelia, Edernburg, Pretoria, Francesco, Ciampa, Emlyndene, Rounton Grange, Premier, Portloe, Crispin, Arthur Balfour, Thorpe Grange, Oakby, George Fisher, Selby, Sutherland Grange, Burnby*, etc. The volume of work thus dealt with places Messrs. Shearman in the front rank of actively engaged concerns.

Messrs. Elliot & Jeffrey were fairly well engaged on surveys on the steamers *Duns Law, Camwell, Poldhu*, also general repairs on the *Tonbridge, Beatus, Polurrian, Noviembre, Lena, Porthkerry*, etc. It is reported, and the report seems well authenticated, that this firm is about to take over the Windsor Slipway from Messrs. Mordey, Carney & Co. As the firm concerned do not possess a dry dock of their own they have consequently to rely on the only public dock which Cardiff possesses in order to deal with their heavy repair work, and as various other firms are similarly situated it follows that inconvenience is very frequently experienced at busy periods. The increasing volume of work attracted by this firm renders expansion imperative in the direction of possessing dry dock or slipway accommodation of their own, and the impending deal is the first step in that direction. The Windsor Slipway, although not contained in the docks area, is conveniently situated between Cardiff and Penarth.

Hill's Dry Docks and Engineering Co. were quietly engaged throughout the month on repairs to the steamers *Chiverstone, Dauntless*, etc., as well as general repairs to sailing ships and steamers throughout the wet docks.

Junction Dry Dock Co., amongst other general repair work, executed plate work on the steamers *Southgate* and *Emma*.

At Barry a moderate amount of business was transacted, the stoppage of fitters seriously obstructing work at the various establishments.

The Graving Dock Co. were fairly actively engaged on general repairs to the steamers *Cober, Tremorvah, Corneille, Cloutsham, Drumcree, Trelawny, Newbiggin, King John*, etc.

Messrs. C. H. Bailey showed all outward signs of enjoying their usual prosperity, as the following list of work will show. Heavy bottom damage on the steamer *Crown*, general repairs on the steamers *Teesbridge, Whitefield, Ariel, Consols, Hemisphere, Commonwealth, Drumgeith, Coquet, Tantallon, Haulwen, Lady Tredegar, Helmsloch, Eskbridge, Trios, Psyche, Everest, Britannic, Evandale, Gloria*, etc.

At Newport and Swansea things were rather quiet.

Visit of World's Largest Sailing Ship.—During the month a notable ship arrived here to receive a cargo for conveyance to the West Coast of South America. She is named *R. C. Rickmers*, is of German nationality, and apart from her commercial character is adapted as a training ship for officers in the service of Messrs. Rickmers, the owners. Her immense size may be comprehended when it is stated that she can carry a cargo of nearly 8,000 tons. She is rigged as a five-masted barque and in addition possesses auxiliary steam power which enables her to make progress through the calm belts encountered on an ocean passage; at the same time the possession of power also enables her to dispense with the services of tugs on many occasions. As an example of the benefit derived from the judicious use of the auxiliary power, it may be mentioned that on her last passage from Vladivostock in Eastern Siberia to Falmouth, the entire distance was covered in the rapid time of 100 days. The crew necessary for a ship of this size is naturally a large one, and numbers over sixty men, as well as sixteen apprentices.

LAUNCHES AND TRIAL TRIPS.

THE TYNE AND WEAR.

William Doxford & Sons, Ltd., Sunderland.

BREIFOND. Launch, June 25th. Oil-carrying vessel, built to the order of Sigval Sergesen, Esq., Stavanger. The length of the vessel is 400 ft., breadth 53 ft., depth moulded 32¾ ft. Deadweight capacity 8,400 tons. Messrs. Doxford are also supplying the engines and boilers. Classification is with the British Corporation.

R. & W. Hawthorn, Leslie & Co., Ltd., Hebburn-on-Tyne.

GLENGYLE. Launch, July 9th. This is the first vessel launched from the new berths at the east end of the builders' shipyard at Hebburn-on-Tyne. The *Glengyle* is a twin-screw passenger and cargo steamer for the service of the Glen Line, Limited (Messrs. McGregor, Gow & Co.), London. The principal dimensions are:—Length, 516 ft. 6 in.; breadth, 62 ft. 4 in.; and depth, 37 ft. 6 in., with a deadweight capacity of 13,400 tons. The vessel, which has been specially designed to meet the requirements of the Eastern trade, has a long bridge, poop and forecastle, with seven large holds. One of the holds and two of the 'tween decks are insulated for the carriage of frozen or chilled cargo. Accommodation is provided in state-rooms amidships for first-class passengers, with a spacious and tastefully decorated saloon underneath. The bridge and poop 'tween decks have been constructed so as to be readily adapted for a large number of third-class passengers. A wireless telegraph installation is being fitted up. The propelling machinery, by the Wallsend Slipway and Engineering Company, Limited, consists of two sets of triple-expansion engines having cylinders 24 in., 40½ and 68 in. by 48-in. stroke, steam being supplied by five single-ended main boilers working at a pressure of 200 lbs., and capable of giving the vessel a sea speed of 12½ knots. Messrs. Wailes, Dove & Co.'s Patent "Bitumastic" enamels have been applied throughout the boiler space, bunkers, holds, etc. and their Patent "Bitumastic" covering to the tank tops.

Sir James Laing & Sons, Ltd., Sunderland.

CALORIC. Launch, July 7th. Oil carrying steamer *Caloric*, built to the order of Wilh. Jebsen, Esq., of Bergen, Norway, through Messrs. H. E. Moss & Co., Liverpool, Newcastle and London. The *Caloric* is intended for the Pacific oil trade and her principal dimensions are :—Length between perpendiculars, 425 feet; breadth, 57 ft.; and depth moulded 33 ft., the carrying capacity being over 10,000 tons. The vessel is constructed on the Isherwood longitudinal system, and to the highest class at Lloyd's under special survey, and complies with Suez Canal and Factory Act Regulations, also the requirements of the Norwegian Board of Trade. The machinery is situated aft, and a long poop deck is arranged to cover machinery and bunker space, and the vessel has a bridge amidships, as well as a topgallant forecastle, all connected with fore and aft gangways. Oil in bulk will be carried in nine double tanks, which are separated from bunkers and cargo hold by oil-tight cofferdams. Provision is made for water ballast in the after peak, deep tank forward, and under the engines and boilers in double bottom. The bunker capacity is specially large and arranged for either coal or oil fuel. A complete installation of steam heating pipes will be fitted in all holds and bunkers to facilitate the discharge of heavy oils. The vessel will be lighted throughout by electricity, and a complete installation for wireless telegraphy will be fitted. The usual deck auxiliaries, consisting of warping winches, windlass, steering gear, all with steam, are of course provided, as well as docking telegraphs and an ice house. The propelling machinery, which will be supplied by Messrs. George Clark, Ltd., consists of triple-expansion single condensing engines having cylinders 27 in., 45 in. 74 in., with a 54-in. stroke, steam being supplied from four multitubular boilers working under forced draught. The oil-burning apparatus will be by the Wallsend Slipway and Engineering Co., to their latest practice.

Osbourne, Graham & Co., Sunderland.

NIEUWLAND. Launch, July 8th. Steel screw steamer specially constructed to the order of Messrs. The Shipping and Coal Co., of Rotterdam. The vessel, whose principal dimensions are 215 feet long by 32 feet 6 ins. broad, is of the single quarter-deck type. She has been constructed to take Lloyd's Highest Class and to comply with the requirements of the Netherland Government, and is fully equipped with the most modern appliances for quick handling of cargo. Engines will be supplied by the North Eastern Marine Engineering Co., Sunderland.

Wm. Pickersgill & Sons, Ltd., Sunderland.

KELBERGEN. Trial Trip, June 20th. This trial was satisfactory in all respects, a mean speed of 12 knots being attained on the measured mile. For Launch, see July issue.

John Readhead & Sons, Ltd., South Shields.

TREWELLARD. Trial Trip, July 13th. A very successful trial trip was run off the Tyne. After the trial, the vessel proceeded to Tyne Dock to load for the Mediterranean, under the command of Captain F. Uren. For Launch, see July issue.

Ropner & Sons, Ltd., Stockton-on-Tees.

Steel Screw Steamer. Launch, June 25th. A steamer of the following dimensions, *viz.* :—Length, 403 ft. 6 in.; breadth extreme, 50 ft. 6 in.; depth moulded, 30 ft. 6 in. The vessel is built to the highest class at Lloyd's, and is of the two deck rule, and fitted with 9 feet 'tween decks. She will have poop, bridge and topgallant forecastle, the framing being of bulb angle. She will be fitted with water ballast tanks on the cellular principle fore and aft, the fore and after peaks also being fitted as water ballast tanks. The vessel has a direct steam quick-warping windlass, stockless anchors, steam-steering gear amidships, with powerful screw gear aft, and is fitted with ten large steam winches, all working at 100 lbs. steam pressure, exhausting into a separate winch condenser. An electric light installation is fitted throughout the ship. The vessel is fitted with double derricks to each hatch, and all her appliances for loading and discharging cargoes are very complete, including a 30-ton derrick working out either the fore main or after main holds. Triple-expansion engines will be supplied by Messrs. Blair & Co., Ltd., of Stockton-on-Tees, having cylinders 26 in., 43 in., 71 in. by 48-in. stroke, steam being supplied by three single-ended boilers, each 15 ft. by 11 ft. 3 in., with a working pressure of 180 lbs., and fitted with evaporator, etc.

Short Bros., Ltd., Sunderland.

DOROTHY T. SHORT. Launch, July 9th. Steamer built on the Isherwood patent system to the order of S. G. Embiricos, Esq., of Athens and Cardiff, her dimensions being length 409 ft., beam 52 ft. and depth moulded 26 ft. 3½ in., and designed to carry a deadweight of about 8,000 tons on a light draught. The vessel, which will take Lloyd's highest class, is of the single-deck type, with shelter deck 8 ft. high, all fore and aft. An extra large quantity of water ballast is provided in the double bottom with very large fore and after-peak tanks. Every arrangement that would conduce to economy has been considered in designing the steamer, with very large hatches to reduce the cost of loading, and the winches specially constructed with extended whipping shafts and large barrels and drums in conjunction with double derricks stepped on tables at each mast, with outriggers above, so that discharging may be rapidly and easily carried out. The saloon, neatly panelled in oak, is situated in a large deckhouse on shelter deck, together with rooms for owner, steward, spare rooms, bathroom, etc. House above saloon is arranged for captain and chartroom, with a teak octagonal wheelhouse above. The officers' and engineers' rooms are in deckhouse alongside engine casing and the crew are berthed in the after end of shelter deck. A large donkey boiler of multitubular type is fitted on the main deck capable of maintaining a full head of steam when all auxiliary machinery is working. The propelling machinery will be fitted by Messrs. John Dickinson and Sons, Limited, of Sunderland, and consists of engines with cylinders 25½ in., 42½ in. and 72 in. diameter, 48-in. stroke, taking steam from two powerful boilers working at 180 lbs. pressure.

Swan, Hunter & Wigham Richardson, Ltd., Wallsend.

RUFFORD HALL. Trial Trip. The trial trip of this vessel off the mouth of the river Tyne was successful in every way. For Launch, see June issue.

Swan, Hunter & Wigham Richardson, Ltd., Newcastle-on-Tyne.

MACCLESFIELD. Successful trials have been completed, and the vessel has taken up her station at Grimsby. Engines and boilers worked very satisfactorily on the trial trip, driving the vessel at a speed of over 13½ knots per hour. For Launch, see July issue.

Wood, Skinner & Co., Ltd., Newcastle-on-Tyne.

SARDINIA. Launch, July 9th. Steel screw steamer built to the order of Mr. Otto Thoresen, of Christiania, Norway, for the fruit trade between the Canary Islands and London and the Continent. The vessel has two steel decks, the upper one being sheathed throughout and is provided with ample water ballast capacity in cellular double bottom all fore and aft and in after-peak tank. A large steel deck-house is fitted amidships, containing saloon, passengers' berths, etc. The vessel will be fitted with exceptional loading and discharging arrangements, comprising a large number of steam winches, double derricks at each hatch, etc., and is also most efficiently ventilated, while she has a complete installation of electric light. The propelling machinery will be of the triple-expansion type of the improved design supplied with steam by two large multitubular boilers working at a high pressure under Howden's forced draught and Schmidt's system of superheating. Both the ship and engines have been constructed to the requirements and under the special survey of Det Norske Veritas for their highest classification. Messrs. Wailes, Dove & Co.'s Patent "Bitumastic" Enamels have been applied throughout the bunkers, chain locker, waterways, etc., and their Patent "Bitumastic" covering to the tank tops.

GRINKLE. Launch, July 11th. Steel screw steamer built to the order of Messrs. The Jarrow Tug and Lighter Co., Limited, Jarrow-on-Tyne. The vessel has been specially designed for the carrying of ironstone from a Yorkshire seaport to the Tyne. She has a specially large hatch and will be fitted with a steam and hand windlass, steam-steering gear, powerful steam winch, and steam and hand-warping capstan aft. The engines are of the inverted cylinder compound surface-condensing type and have been constructed by Messrs. Lidgerwood, Limited, of Coatbridge, while the boiler has been built and will be fitted by Messrs. Palmers' Shipbuilding and Iron Co., Limited, Hebburn-on-Tyne. Both the ship and engines have been constructed under the special survey of Lloyd's for their highest classification.

THE TEES AND HARTLEPOOLS.

Craig, Taylor & Co., Ltd., Stockton-on-Tees.

DOCKBRIDGE. Launch, June 25th. Single-deck screw steamer of the following dimensions, *viz*, :—251 ft. by 36 ft. 3 in. by 22 ft. 2 in. moulded to top of arch. She is built of steel on the Arch-Ballard Patent system of construction, the proprietors of which are Messrs. Swan, Hunter & Wigham Richardson, Ltd., and Mr. Maxwell Ballard, to the highest class in Lloyd's registry, under special survey, and has poop and topgallant forecastle, water ballast in double bottom fore and aft and in peaks. She is equipped with patent steam windlass with quick-warping ends, steam-steering gear, five steam winches, telescopic masts, and all the latest improvements for rapid loading and discharging. The vessel is a self-trimmer with specially large hatches, the holds being quite clear of beams or stanchions. Her engines are being fitted by Messrs. Richardsons, Westgarth & Co., Ltd., Hartlepool, the cylinders being 17⅓ in., 24¼ in., 46⅝ in. by 31½-in. stroke, with two large single-ended steel boilers working at 180 lbs. pressure. In addition to general trades, the vessel is also specially adapted for timber, coal and ore carrying. She has been built to the order of Captain T. L. Weiss, of Newcastle, and Mr. W. H. Loveridge of West Hartlepool.

Wm. Gray & Co., Ltd., West Hartlepool.

RICARDO A. MESTRES. Trial Trip, June 22nd. Screw steamer built for Ricardo A. Mestres, Ltd. (Messrs. Andrew Weir & Co., London, managers) for the bulk oil carrying trade. The vessel is built to the highest class in the British Corporation Registry and is of the following dimensions, *viz.*—Length overall, 377 ft.; breadth, 50 ft. 9 in; depth, 29 ft. 3 in. The ship is unique, being the first of a new type of tank steamer specially constructed for expeditiously handling the heaviest grades of oil. A feature of interest to owners of bulk oil carrying vessels is the scientific construction of the oil compartments. The holds of the vessel are sub-divided by ten semi-circular bulkheads which form five large tanks above the cellular bottom. These bulkheads are free from stiffeners, gussets and stays, being connected to the deck and tank top by a double riveted foundation angle connection. The inside of each compartment thus formed, is therefore free from all obstruction, and can be readily cleaned. Added to this, there are no riveted stiffeners and stays to work loose, and therefore the bulkhead repair bills (a very heavy item as owners know to their cost) will be reduced to a minimum, the circular form of tank being the strongest possible receptacle to carry any liquid. The oil-tight surfaces can be inspected at any time and can be kept constantly under observation. It is claimed that heavy and viscous oils can more readily be handled, as the cylindrical tanks are free from the cooling action of the sea water which considerably reduces the temperature to which the oil can be raised, so that less steam is required to heat the oil in the cylinders with a consequent saving in coal. The vessel carries the full deadweight of oil in the cylinders, having stowage at 40 sq. ft., whereas if it is required to carry light oils, the summer tanks or spaces outside the cylinders have ample capacity for the lightest oils. A large trunk running fore and aft is provided for the expansion of the oil or for varying densities. Two separate pump rooms are fitted amidships, each having a large cargo oil pump of the "Cmew" type and oil pipe line capable of discharging the whole of the cargo in twenty-four hours. The bunkers are constructed to carry coal or oil fuel. Separate steaming out pipes for cleaning the tanks and pipes for fire extinguishing are also fitted. Electric lighting is installed throughout and the accommodation is heated by steam to avoid risk of fire. Direct steam windlass, steam winches, steam-steering gear and hand gear, two masts, schooner rigged and all necessary outfit for her special trade, are provided. The machinery has been made at the Central Marine Engine Works of the builders. The engines are of the triple type, having cylinders 25 in., 41 in., and 68 in. diameter, with a stroke of 48 ins., and placed in the after part of the vessel. There are three large steel boilers adapted for 180 lbs. working pressure per square inch and fitted with an oil fuel burning installation. A special system of "Cmew" auxiliaries, including a winch condenser, evaporator, independent feed pumps fitted with a suction filter, direct contact overhead feed heater, oil film heaters, oil fuel pumps, etc., are installed in the engine room. Other parts of the vessel are up-to-date in every detail, and in accordance with the highest and latest improvements for carrying oil in bulk. An average speed of 11¾ knots was obtained, the performance of ship and machinery being entirely satisfactory.

DRUJBA. Trial Trip, June 24th. The performance of ship and machinery was very satisfactory, an average speed of 12 knots being obtained. The vessel afterwards proceeded to the Tyne to load. For Launch, see June issue.

ROSENBORG. Trial Trip, June 30th. The trial trip was a satisfactory one in all respects, an average speed of 10½ knots being obtained. Captain Jans was in command. For Launch, see June issue.

ORMARA. Trial Trip, July 7th. A very satisfactory trial was effected, the vessel afterwards proceeding to Middlesbrough to load. For Launch, see June issue.

SKJOLDBORG. Launch, July 8th. Steel screw steamer built to the order of C. K. Hansen, Esq., Copenhagen. She will take the highest class in Lloyd's Register, and is of the following dimensions, *viz.* :—Length overall, 290 ft. 6 in.; breadth, 40 ft., and depth, 21 ft. 4 in., with long bridge, poop and forecastle. The hull is built with deep frames, cellular double bottom and large after-peak ballast tank, five steam winches, steam steering gear, hand screw gear aft, patent direct steam windlass, vertical multi-tubular donkey boiler, steel shifting boards, stockless anchors, telescopic masts with fore and aft rig, cargo gaffs, and derricks, boats on deck overhead, and all requirements for a steamer specially equipped for the Baltic and Home trades. Triple-expansion engines are being supplied by The Central Marine Engine Works of the builders, having cylinders 20 in., 31½ in. and 53 in. dia., with a piston stroke of 36 inches, and two large steel boilers with a working pressure of 180 lbs. per square inch. The engine room auxiliaries include an evaporator, feed and ballast pumps of the "Cmew" type.

CHILKANA. Launch, July 9th. Steel screw steamer, built for The British India Steam Navigation Company, Ltd., London. The vessel will take the highest class in Lloyd's Register, has a Board of Trade passenger certificate and is of the following dimensions, *viz.* :—length overall 412 ft. 6 in., breadth 53 ft. 6 in. and depth 29 ft. 7½ in. She is a handsomely modelled vessel having two decks laid, with poop, long bridge and forecastle, and very tasteful cabin accommodation in houses on the bridge deck for passengers, captain and officers and the crew's berths in the forecastle. She is fitted with wireless telegraphy and has an electric light installation throughout. The hull is built with deep frames, cellular double bottom and after-peak ballast tank. The whole of the outfit, including sanitary tanks, fresh water distiller, steam windlass, steam-steering gear, twelve derricks, thirteen winches with return exhaust to winch condenser of "Cmew" type, are of the most approved description. Triple-expansion engines are being supplied by The Central Marine Engine Works of the builders, having cylinders 28 in., 46 in. and 77 in. dia., with a piston stroke of 48 inches, and three large steel boilers adapted for 180 lbs. working pressure per square inch, and fitted with Howden's system of forced draught. The engine room auxiliaries are very complete and include evaporator, feed and ballast pumps, independent feed pumps combined with a gravitation filter, feed water purifier, direct contact heater and oil separator, all of the "Cmew" type.

Irvine's Shipbuilding & Dry Docks Co., Ltd., Harbour Dockyard, West Hartlepool.

HAMBLETON RANGE. Launch, June 25th. Steel screw steamer, built to the order of Messrs. Furness, Withy and Co., Ltd. for the Neptune Steam Navigation Co., Ltd. The dimensions of the vessel are 362 ft. by 51 ft. 0½ in. by 26 ft. 3 in., having a deadweight carrying capacity of about 6,640 tons. She is built to Lloyd's highest class on the shelter deck principle, having two complete steel decks and a topgallant forecastle, and water ballast is carried in cellular double bottom and fore and after peaks. The vessel is constructed with deep frames without side stringers, giving exceptionally clear holds for the stowage of bulky cargoes. Wood grain divisions are fitted throughout the holds to Board of Trade requirements, and the vessel is divided into seven watertight compartments by six transverse bulkheads. Four large hatches are provided, with nine powerful steam winches worked from a multitubular donkey boiler and exhausting into a winch condenser, and all the latest improvements are included for the rapid loading and discharging of cargo. A powerful quick-warping steam windless is fitted forward, and steam-steering gear amidships with hand screw gear aft. A large ice house is also fitted for the crew's provisions, etc. The lighting, ventilating and sanitary arrangements have received special attention, the most improved methods being adopted throughout. The machinery, which has been constructed by Richardsons, Westgarth & Co., Ltd., Hartlepool, consists of a set of Richardson's standard triple-expansion engines, having cylinders 25 in., 40 in. and 67 in. by 45-in. stroke, with two large boilers, 180 lbs. pressure. The condenser is of the contraflo type with air pump temperature regulator, and the engine room auxiliaries include a cascade filter, Morison evaporator, large ballast donkey and harbour feed donkey, etc.

Irvine's Shipbuilding & Dry Docks Co., Ltd., Middleton Shipyard, West Hartlepool.

SANTERAMO. Launch, June 24th. Steel screw steamer built to the order of Messrs. Furness, Withy & Co., Ltd. for the Gulf Line Limited. The dimensions of the vessel are 400 ft. by 52 ft. by 29 ft. 6 in. depth moulded, carrying over 8,000 tons on a moderate draught. She is built to Lloyd's highest class having a single deck of steel, with poop, bridge and forecastle, and water ballast is carried in cellular double bottom and fore and after peaks. The vessel is constructed with deep frames and longitudinal side stringers, giving clear holds for the stowage of bulky cargoes, and is divided into seven watertight compartments by six transverse bulkheads. Wood grain divisions are fitted throughout the holds according to the latest Board of Trade regulations, four large hatches are provided, together with a cross bunkerhatch, and the vessel is replete with all the latest facilities for the rapid loading and discharging of cargo, including ten steam winches and twelve derricks. A powerful quick-warping steam windlass is fitted forward, with steam-steering gear amidships and hand screw gear aft. A large ice house is also fitted for the crew's provisions, etc. The lighting, heating and sanitary arrangements have received special attention, the most improved methods being adopted throughout. The machinery, which has been constructed by Messrs. Richardsons, Westgarth & Co., Ltd., Hartlepool, consists of a set of "Richardsons" standard triple-expansion engines, having cylinders 25 in., 40 in. and 68 in. by 48 in., with three large boilers working at 180 lbs. pressure. The condenser is of the Contraflo type, and the engine room auxiliaries include a Contraflo winch condenser, Cascade filter, Morison's evaporator, etc.

Irvine's Shipbuilding & Dry Docks Co., Ltd., West Hartlepool.

CORINTHIC. Trial Trip, June 23rd. The official trial trip was run in Hartlepool Bay. Throughout the trial the engines and all auxiliaries worked admirably, a speed of 12 knots being attained, and the vessel afterwards proceeded on her voyage to Cardiff. For Launch, see June issue.

Ropner & Sons, Ltd., Stockton-on-Tees.

LEVNET. Trial Trip, June 25th. After some very satisfactory trial runs in the Tees Bay, during which the vessel attained a speed of about 11¾ knots on the measured mile, she proceeded to Barry to load. For Launch, see June issue.

Sir Raylton Dixon & Co., Ltd., Middlesbrough.

MICHAEL. Trial Trip, July 11th. The trials of this vessel passed off most successfully; she afterwards proceeded to Liverpool under the command of Captain W. E. Downing. For Launch, see April issue.

THE HUMBER.

Cochrane & Sons, Ltd., Selby.

VELIA and MENA. Launches, June 27th. Steel screw trawler *Velia*, principal dimensions, 130 ft. by 23 ft. 6 in. by 13 ft. 6 in. moulded. The vessel has been built to the order of Messrs. J. Marr & Son, Ltd., Fleetwood, and will be fitted with powerful triple-expansion engines by Messrs. C. D. Holmes and Co., Ltd., of Hull. Afterwards the *Mena*, another trawler, was launched, the principal dimensions being 122 ft. by 22 ft. 3 in. by 12 ft. 4 in. moulded. The vessel has been built to the order of Messrs. Roberts & Ruthven, Ltd., Grimsby, and will be fitted with powerful triple-expansion engines by Messrs. C. D. Holmes & Co., Ltd.

ORIANDA and VIERNO. Launches, July 11th. Two steel screw trawlers, principal dimensions, 129 ft. 8 in. by 22 ft. by 13 ft. 10 in. moulded, built to the order of Messrs. The Dolphin Steam Fishing Co., Ltd., and Messrs. The Arctic Steam Fishing Co., Ltd., Grimsby, both vessels will be fitted with powerful triple-expansion engines by Messrs. Amos and Smith, Ltd., Hull.

Livingstone & Cooper, Ltd., Hessle.

JACK SALMON. Launch, July 9th, 1914. Drifter, 98 ft. 9 in. by 18 ft. 6 in. by 9 ft. 9 in. moulded. The vessel, which exceeds Lloyd's requirement, is built of steel to the order of Messrs. Salmon & Co. (Great Yarmouth Steam Drifters, Ltd.). After the launch the vessel was berthed alongside the firm's yard to finish fitting out. The party adjourned to the builders' office, where breakfast was served, and the usual toasts were given and responded to. The vessel has been removed to the Hull Docks to receive her boiler. Then she will be towed to Yarmouth to receive her machinery by Messrs. Crabtree & Co., Ltd.

NORTH-WEST OF ENGLAND.

Cammell, Laird & Co., Ltd., Birkenhead.

KARMALA. Trial Trip. This steamship has left the Mersey after being taken over by the P. and O. Company's representatives on the satisfactory conclusion of her official trials. For Launch, see April issue.

SOUTH OF ENGLAND.

Day, Summers & Co., Ltd., Southampton.

DOCKGATES. Launches, July 6th and 8th. The Dockgates which this Company has been building for the Admiralty for Portsmouth Dockyard were launched on above dates and towed direct down to Portsmouth Dockyard, and erection of the gates commenced on 9th of July.

TEIGN. Launch, July 9th. The third cargo boat built for the R.M.S.P. Co.'s inter-colonial service by Messrs. Day, Summers & Co., Ltd. The dimensions of the vessel are 110 ft. long by 21 ft. beam by 11 ft. deep. She has single-screw compound engines and cylinders 15 in. and 30 in. diameter.

Philips & Sons, Ltd., Dartmouth.

HAIMARA. Trial Trip, June 30th. This twin-screw passenger steamer, built to the order of the Crown Agents for the Colonies, was successfully tried at sea on the above date. For Launch, see July issue.

LUKANANI. Launch, July 14th. Twin-screw passenger steamer, building to the order of the Crown Agents for the Colonies. The vessel and her machinery have been designed and are being built under the supervision of Messrs. Flannery, Baggallay & Johnson, Ltd., of London, Liverpool and Rotterdam. The vessel is one of the six similar vessels which Messrs. Philip & Sons are building for passenger ferry service in British Guiana. For further particulars see *Haimara*, July issue.

SCOTLAND.

Barclay, Curle & Co., Glasgow.

MISSANABIE. Launch. Twin-screw steamer for the Liverpool—St. Lawrence service of the Canadian Pacific Railway Company. The vessel is 520 ft. in length, 64 ft. in breadth, 41 ft. in depth, of 13,000 tons gross, 18,000 tons displacement, and 400,000 cubic feet cargo capacity. She will have accommodation for 520 cabin passengers, berthed in large, airy rooms, and 1,200 third class, also in large rooms, and she will carry a crew of 300, making a grand total of 2,020.

The propelling machinery consists of twin sets of quadruple-expansion engines, balanced on the Yarrow, Schlick and Tweedy system. Steam is supplied by eight single-ended boilers at a working pressure of 215 lbs. It is anticipated that the vessel will have a speed of 16 knots on service.

Wm. Beardmore & Co., Dalmuir.

INCONSTANT. Launch, July 6th. Light armoured cruiser, the second of three similar ships which they are building for the British Navy. The *Inconstant* is a sister ship to the *Galatea*, which Messrs. Beardmore launched in May. She is of 3,500 tons gross and 30 knots speed, and is of the new type of scouts, already known as "destroyers of destroyers." She will burn oil fuel, and is 450 ft. in length.

Bow, M'Lachlan & Co., Paisley.

MAKO. Launch, June 23rd. Passenger and cargo steamer built for Messrs. Richardson & Co., Napier, New Zealand. The vessel has been specially designed for coasting service.

SABLE I. Trial Trip. This new steamer has run trials, and everything worked satisfactorily, the contract speed being exceeded. For Launch, see June issue.

Caird & Co., Greenock.

KAISAR I HIND. Launch, June 28th. Twin-screw steamer built for the Bombay mail service of the Peninsular and Oriental Steam Navigation Company. The vessel is 11,500 tons gross, and is 540 ft. long, 61 ft. 6 in. broad, and 46 ft. deep. She is in many ways similar to the *Medina*, the Greenock-built P. & O. liner on which the King and the Queen made the Coronation Durbar voyage to India. Quadruple-expansion engines will be supplied by the builders. Messrs. Matthew Keenan & Co., Ltd., have the contract to cover the boilers and steam pipes with their patent non-conducting composition, and to insulate the engine and boiler casings with their patent bulkhead insulation.

Charles Connell & Co., Scotstoun.

MALAKUTA. Launch, June 25th. Steamer built to the order of Messrs. T. & J. Brocklebank, Liverpool, for the Glasgow, Liverpool and Calcutta service of the Anchor-Brocklebank Line. The dimensions are :—Length, 470 ft. ; breadth, 58 ft. ; depth, 35 ft. She is of 7,200 tons gross and about 11,000 tons deadweight. She has a complete outfit of cargo gear, including sixteen derricks and thirteen winches. Triple-expansion engines and three large boilers are being supplied by Messrs. David Rowan & Co., Glasgow. The vessel is designed to maintain a speed of over 12 knots at sea. The *Malakuta* is the first of four vessels which the builders have in hand for Messrs. Brocklebank, the other three being of the same dimensions, but in their cases machinery will consist of geared turbines of the Parsons type.

Wm. Denny & Brothers, Dumbarton.

PRINCESS MARGARET. Launch, June 24th. Steamer built for the Canadian Pacific Railway Company, and the first of two passenger steamers which are being built by Messrs. Denny for the same owners. They will be used in the British Columbia Coast service between Vancouver, Victoria, and Seattle. Their principal dimensions are :—length, 395 ft. ; breadth moulded, 54 ft. ; depth to promenade deck, 28 ft. 3 ins. They have each forty-two state-rooms, and a vestibule which is panelled in white and lit by a very large dome skylight having softly tinted glass. The first-class smoke room is in Old English style. On the promenade deck there are seventy-seven first-class state-rooms and eight special rooms *en suite*. These special state-rooms are executed in different styles such as Adam, Sheraton, Chippendale, etc. At the forward end is the observation room, which is a feature in the Company's Pacific steamers. The upper deck is devoted to passenger accommodation. The tea room and the writing room are framed in mahogany and have French windows opening into the vestibules. The main deck aft is fitted up as a dining saloon for first-class passengers, and has accommodation for 160 persons. The dining saloon is in the Georgian style. The vessel will be propelled by geared turbines, supplied with steam by oil-fired water-tube boilers, the installation being by Messrs. Denny & Co. The new vessel will have a speed of from 22 to 23 knots.

Dunlop, Bremner & Co., Port Glasgow.

AGAMEMNON. Launch, June 26th. Single screw steamer built to the order of the Koninklijke Nederlandsche Sotomboot Maatschappij, of Amsterdam, for their general cargo trade. The vessel is 295 ft. in length, 43 ft. in breadth, and 29 ft. 6 in. in depth, and of about 1,950 tons gross. A feature of her construction is her cruiser stern. She will have triple-expansion engines, by the builders, having cylinders 22 in., 35 in. and 59 in. respectively, with a stroke of 39 in. Steam will be supplied by two large single ended boilers fitted with Schmidt's superheaters, working in conjunction with Snowden's forced draught.

Fleming & Ferguson, Paisley.

SIR WILLIAM MATTHEWS. Trial Trip. Satisfactory dredging and speed trials were recently completed by this dredger. For Launch, see May issue.

J. & G. Forbes, Sandhaven.

AGNES AND JANET. Launch, June 27th. Steam drifter of the latest type launched to the order of Messrs. R. Hastie & Co., fish salesmen, South Shields. The vessel measures 89 ft. between perpendiculars, 18 ft. 10 in. in beam, and 9½ ft. in depth.

John Fullerton & Co., Paisley.

DINGLE. Launch, July 15th. Steel screw steamer of about 750 tons deadweight, built to the order of the West Lancashire Steamship Company, Limited, Liverpool (Messrs. Alfred Rowland & Co.), being the fourth steamer supplied to that firm this year. Engines of 650 i.h.p. are being supplied by Messrs. Ross & Duncan, Govan.

Greenock & Grangemouth Dockyard Co., Ltd., Greenock.

SAXONIAN. Trial Trip, June 19th. This vessel was successfully tried at sea on the above date when her contract speed was exceeded. For Launch, see June issue. Messrs. Matthew Keenan & Co., Ltd., have completed the boiler and pipe covering on this vessel.

INKISI. Launch. Oil tank steamer of 4,800 tons gross, built for the Compagnie Belge Maritime du Congo, Antwerp. The chief dimensions of the vessel, which has been constructed on the Isherwood system, are :—Length, 376 ft., b.p. ; breadth, 53 ft. 3 in. ; depth, 27 ft. 9 in. ; and her carrying capacity is 6,400 tons on a 22 ft. 4 in. draught. She will be fitted with twenty-three oil tanks, and triple-expansion engines will be supplied by Messrs. Dunsmuir & Jackson, Govan. Messrs. Wales, Dove & Co.'s patent "Bitumastic" enamels have been applied throughout the bunkers, tanks, etc., and their patent "Bitumastic" covering to the tank tops.

Greenock & Grangemouth Dockyard Co., Ltd., Grangemouth.

VENICE. Launch. Steamer built to the order of Messrs. Furness, Withy & Co., West Hartlepool. The vessel is 80 ft. in length ; 40 ft. in breadth, and 20 ft. 6 in. in depth. She is of the well-deck type, built to the highest class of the British Corporation, and is designed to carry a deadweight of 3,250 tons.

MINISTRO EZCURRA. Trial Trip. Oil tank steamer, has completed her speed trials on the Firth of Forth with satisfaction. For Launch, see May issue.

Harland & Wolff, Ltd., Glasgow.

EGORI. Trial Trip, June 20th. After satisfactory trials this vessel proceeded to Liverpool. The *Egori* is commanded by Captain James Tyrer. For Launch, see June issue.

David & William Henderson & Co., Ltd., Partick.

HERSCHEL. Trial Trip, June 24th. During the trials on the Firth of Forth everything worked to the entire satisfaction of owners and builders. For Launch, see June issue.

A. & J. Inglis, Glasgow.

ST. SEIRIOL. Launch. Twin-screw geared turbine steamer for the Liverpool & North Wales Steamship Co.'s fleet of passenger steamers. It is not expected that the vessel will be able to take her place on the Liverpool and North Wales station until nearly the end of the present passenger season, instead of at the beginning, as was anticipated when the contract was placed.

Lobnitz & Co., Ltd., Renfrew,

DRAGUE No. 6. Launch, June 23rd. Direct-geared bucket dredger, built to Bureau Veritas highest class, under the inspection of Monsieur Billy, for service on the Suez Canal.

Archd. McMillan & Son, Ltd., Dumbarton.

NESTOS. Trial Trip, July 6th. The steamer ran trials on the Firth of Clyde, which proved most satisfactory. The steamer thereafter left for Alexandria. For Launch, see July issue.

Mackie & Thomson, Irvine.

LALANDIA. Launch. Twin-screw motor vessel built to the order of the East Asiatic Company of Copenhagen by Messrs. Harland & Wolff in conjunction with Messrs. Mackie and Thomson, and launched at Irvine. The vessel has a length of 381 ft. over all, a breadth of 50 ft. (moulded), and a measurement of about 4,500 tons gross. She will have accommodation for first-class passengers. The winches, windlasses, etc., for handling the cargo are electrically operated. Wireless telegraphy and electric lighting are also being installed. The propelling machinery will consist of two four-stroke cycle, single-acting Diesel motors, each coupled direct to its own line of shafting. It is being supplied by the Burmeister & Wain (Diesel System) Oil Engine Company, Glasgow. Two smaller motors of the same type are to be fitted for driving the air compressor and the dynamo. Messrs. Wailes, Dove & Co.'s patent "Bitumastic" enamels have been applied throughout the bilges, etc. The vessel is the first to be launched from the new yard at Irvine.

Montrose Shipbuilding Co., Montrose.

ADMIRABLE. Launch, June 20th. Steam drifter for Mr. Reid, Port Gordon. The vessel is to have engines of 250 i.h.p. by Mr. W. V. V. Ledgerwood, Coatbridge.

Russell & Co., Port Glasgow.

MINNIE DE LARRINAGA. Launch. Shelter-deck steamer of about 5,000 tons gross, built for Messrs. Larrinaga and Co., Liverpool. The vessel is 420 ft. in length, 54 ft. in breadth, and 28 ft. 5 in. in depth. Messrs. Rankin & Blackmore, Greenock, will supply the machinery.

Scott & Sons, Bowling.

LINDA BLANCHE. Trial Trip. Trials have been completed on the measured mile at Skelmorlie with very satisfactory results. The machinery worked to the entire satisfaction of the owners. For Launch, see July issue.

WRESTLER. Launch, June 25th. Powerful single-screw tug built for Messrs. Steel & Bennie, Glasgow. The machinery which has been constructed by Messrs. Aitchison, Blair, Clydebank, consists of the usual compound surface condensing engines, which are designed to attain a high rate of speed. Steam will be generated by an extra large boiler supplied by Messrs. Dunsmuir & Jackson, Govan. The vessel is chiefly intended for towing cargo vessels.

Alex. Stephen & Sons, Ltd., Govan.

UMARIA. Launch, July 9th. Screw steamer *Umaria* for the general cargo service of the British India Steam Navigation Co., Ltd. Dimensions are:—Length 410 ft., breadth 52 ft., depth 31 ft. She is designed for the cargo trade, with a large number of winches and derricks of superior type, as usually supplied to the British India Company. The propelling machinery, consisting of one set of triple-expansion engines, with three large single-ended boilers, will be supplied by the builders.

IRELAND.

Harland & Wolff, Ltd., Belfast.

ORBITA. Launch, July 7th. Triple screw mail and passenger steamer built to the order of The Pacific Steam Navigation Company, Liverpool. The new vessel is 569 ft. 3 in. length over all, 67 ft. beam, and will have a gross tonnage of about 15,500 tons, and has been designed specially for The Pacific Company's Service to the East and West Coasts of South America, having, besides extensive passenger accommodation, very large capacity for cargo, the arrangements for which are of the most approved character. The vessel is very strongly constructed with double bottom throughout, ten water-tight bulkheads and seven steel decks. The *Orbita* will have accommodation for, in all, over 1,100 passengers—first, second, intermediate and third-class. The first class dining saloon, on the main deck, extends the full breadth of the vessel. It is framed and panelled, and finished in white and gold. This saloon will seat 197 persons. The first-class smokeroom, lounge and verandah are situated on the promenade deck The first-class state-rooms are arranged on the shade and awning decks, and are all fitted with comfortable bedsteads. The second-class dining saloon is on the main deck and extends the full width of the ship. It will seat 207 persons. The second-class smoke room, is situated at the after end of the promenade deck, the second-class verandah and lounge on the shade deck. The intermediate accommodation consists of dining saloon, to seat 122 persons, general room, and state-rooms, suitably furnished and in good positions in the ship, and this class will be very comfortable. The third-class accommodation is also of a superior character, and all arranged to pass the requirements of the Board of Trade and Spanish law. The refrigerating plant is of the horizontal duplex marine type, with surface condenser. The steering gear is of Harland & Wolff's latest type. There are twelve cargo and warping winches and four electric boat winches, besides capstan and steam windlass. The steamer will be equipped with a sufficient number of lifeboats to accommodate all persons on board. Needless to say, the vessel has complete installation of electric light, and is also fitted with wireless telegraphy and submarine signalling, together with combined Semaphore and Morse signalling appliances. The *Orbita* will have a combination of reciprocating engines and low-pressure turbines. She will have two steel pole masts, fore and aft, schooner rigged. The vessel and machinery are being built to the highest requirements of Lloyd's for 100 A1 class. The *Orbita* and her sister ship *Orduna* will be the largest steamers engaged in the service between Europe and the West Coast of South America. Another mail steamer, similar to the *Orbita*, is now being built for the Company, and will be named the *Orca*.

STATENDAM. Launch, July 9th. Triple screw passenger and mail steamer, built to the order of the Holland America Line for their service between Rotterdam and New York. The vessel is nearly 770 ft. in length over all and over 86 ft. beam, with a gross tonnage exceeding 33,000 and a displacement of 44,000 tons. She has been built to the highest class at Lloyd's, and under survey of the British Board of Trade for passenger certificate, also to meet the requirements of the Dutch and American laws. The structure of the hull is exceedingly strong. The double bottom extends right fore and aft, and there are eleven watertight bulkheads carried up to the bridge deck at the fore part of the vessel and the saloon dock at the after part. There are nine steel decks. The vessel will have three funnels and two steel pole masts, fore and aft schooner rig, four derrick posts, and twenty-five steel derricks, electric winches and Harland & Wolff's steam steering gear controlled by telemotor from the navigating bridge. Needless to say, there will be a complete installation of electric light, also emergency lighting and wireless telegraphy and submarine signalling apparati will be fitted. The arrangements generally for working ship and cargo will be of the most complete character. The passenger accommodation will be of a sumptuous style, over 3,000 passengers in all being provided for—800 first, 630 second and nearly 2,000 third-class. The first-class passengers will be accommodated in one-berth, two-berth, and three-berth rooms; the second-class in two and four-berth rooms. The first-class public rooms include dining saloon on saloon deck, reading and writing room, lounge and palm court, smoke room and verandah, all on the upper promenade deck, and gymnasium on boat deck. The forward stairway will have two passenger elevators serving six decks. The first-class staterooms include 32 *en suite* rooms on the lower promenade deck, the other state-rooms being arranged on the upper, saloon, bridge and lower promenade decks, there being a very large number of one-berth rooms. Many of the first-class state-rooms are arranged on the tandem principle, securing natural light and ventilation to each. A feature of the vessel is the number of first-class rooms with sidelights and cot beds. There will be a maids' and valets' dining saloon arranged at the after end of the first-class accommodation on the bridge deck. The second-class public rooms include dining saloon, smoke room and library, and the state-rooms are arranged on the saloon, upper and middle decks. The third-class passengers have a general room and smoke room on the saloon deck aft, also a smoke room on the same deck forward. The mess rooms are large, comfortable apartments on the middle deck, and the sleeping accommodation includes a large number of permanent and portable rooms. The captain's and officers' accommodation is in a deck-house at the fore end of the boat deck; the engineers' on the port side of the upper deck, convenient to the engine room. The emergency lighting set, consisting of Diesel engine and dynamo is arranged in a steel house at the after end of the saloon deck, with storage tanks on bridge deck overhead. Boats are provided sufficient for all on board. As already indicated she is a triple screw steamer having a combination of the most highly perfected reciprocating engines with a low-pressure turbine. In addition to the other first-class state-rooms, there are, as already mentioned thirty-two special suite state-rooms, comprising sixteen bedrooms and sixteen sitting-rooms with adjoining bath and wardrobe rooms.

The North of Ireland Shipbuilding Co., Ltd., Londonderry.

BEDALE. Launch. Steamer building to the order of Messrs. Furness, Withy & Co., Ltd., West Hartlepool. The vessel is constructed to the requirements of Lloyd's Register for their highest class, and has certain additions to her scantlings to meet the special requirements of her owners. She is also built on the arch principle, the proprietors and licensors of this method of construction being Messrs. Swan, Hunter, and Wigham Richardson, Ltd., and Mr. Maxwell Ballard. The vessel has a length of 279 ft. between perpendiculars, a breadth extreme of 40 ft. 4 in., and a moulded depth of 18 ft. 9 in., with a 6 ft. arch, and is designed to carry about 3,375 tons on a load draught of 18 ft. She has one continuous deck with poop and forecastle. There are two spacious clear holds with two large hatches in each, thus ensuring rapid loading and discharging, the vessel being, moreover, practically self-trimming. She will have two masts, four derricks and five powerful steam winches; also a steam windlass with quick-warping ends, and a steam-steering gear, the latter fitted up in a house on the poop deck controlled by telemotor gear from the navigating bridge. The machinery, which is now being fitted on board at Londonderry under the builders' 70-ton crane, is of triple-expansion type, with cylinders $20\frac{5}{8}$ in., 33 in. and 54 in. by 36-in. stroke; these are supplied with steam from two single-ended boilers 13 ft. diameter by 10 ft. 6 in. long, working at a pressure of 180 lbs. per square inch. Both machinery and boilers have been built by Messrs. Richardsons, Westgarth & Co., Ltd., at their Middlesbrough works.

Workman, Clark & Co., Ltd., Belfast.

ESSEQUIBO. Launch, July 6th. Twin-screw steamer launched from the south yard. The vessel is intended for service between Great Britain, the West Indies and New York and is 467 ft. long, with a gross tonnage of about 8,500, and has been built under Lloyd's special survey. The first-class accommodation comprises state cabins with lavatories attached, and a number of single and double-berth rooms. with bedsteads instead of berths. The first-class dining saloon is arranged on the restaurant plan with ample arrangements for expeditious service. The lounge is a spacious and lofty apartment with large bay windows, and the smoke-room is effectively decorated in the Tudor style. A large verandah cafe is fitted abaft the smoking room, The second class accommodation comprises dining saloon, smoking room and social hall, each decorated in tasteful style and handsomely furnished and upholstered. The appliances for working the ship and cargo are of the most approved type and include noiseless hydraulic cranes. An emergency lighting dynamo with oil motor on the boat deck is provided, and there is sufficient boat accommodation for all persons on board, while wireless telegraphy, submarine signalling and, in fact, every modern contrivance necessary to the comfort and safety of the passengers and staff have been provided. The machinery of the vessel consists of two independent sets of quadruple-expansion engines carefully designed and adjusted so as to reduce vibration. The engine room equipment contains a complete installation of auxiliary plant, including steam pumps for various duties, electric light dynamos and refrigerating machinery. Steam is generated in six steel cylindrical boilers working under forced draught.

CITY OF EXETER. Trial Trip. This vessel has been just taken over by the owners from Messrs. Workman, Clark and Co., Ltd., after having run very successful trial trips, when a speed of 15 knots was obtained. For Launch, see May issue.

Abridgments of New Patents.

Compiled by Messrs. E. P. Alexander & Son, Chartered Patent Agents, 306, High Holborn, London, W.C.

6077. Casings of Turbines.—To prevent distortion due to heat inequalities, the casing *b* of a radial-flow turbine is secured to an outer jacket *a* by radial guides *e*, which are movable with respect to *a* or *b* or both. The lateral steam-chests *d* are secured to the casing *b* in the same manner. In a modification, links *i*, Fig. 5, are substituted for the radial guides *e*. *Disposing of Exhaust.*—Radial movement of the exhaust conduit *g*, Fig. 1, is permitted by the provision of guides *f*. A diffusion ring is described mounted in the casing in the same manner as the steam chests *d* in Fig. 1.

FIG. 5.

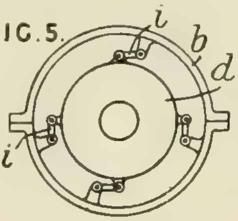
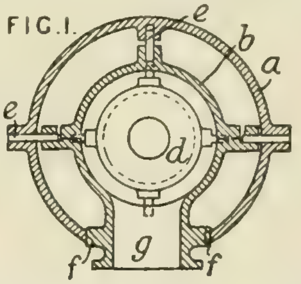
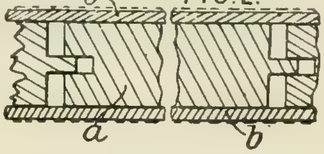


FIG. 1.



6106. Bulkheads.—The bulkheads of ships are constructed of plain wooden boarding *a* lined on each side with plates or sheets *b* of fireproof material, such as asbestos and cement. The boards are tongued and grooved, to allow for expansion of the wood.

FIG. 2.



6248. Steam Superheaters. Water is injected into the inlet end of a superheating-tube M through a perforated closed-ended pipe R placed in the end of the tube. A helical baffle S is placed between the tube and the pipe, and the perforations are arranged around the edge of the baffle along the whole length of the pipe.

FIG. 2.

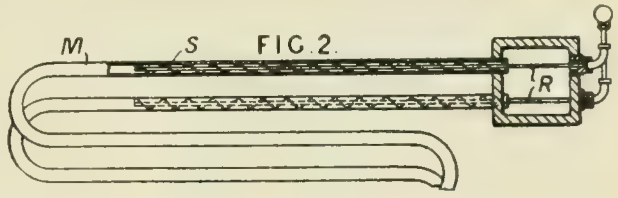
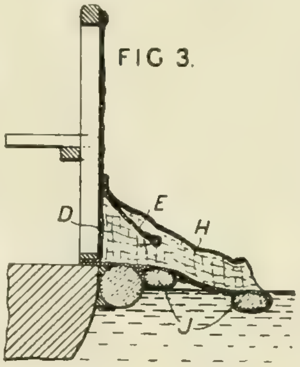


FIG 3.



6631. Water Escape Ports for Life-boats.—Life-boats with collapsible bulwarks are provided with water-escape ports D fitted with outwardly-opening weighted flap-valves E, and trunks H of the same contour as the port D surrounding the valves E. Floats J are secured to the lower side of the trunk, and the upper edge of the trunk may be weighted.

BOARD OF TRADE EXAMINATIONS.

APRIL 2nd, 1914.—LONDON.—*1st Class:* M. Blakey, D Brown, D. Lonergan. *2nd Class:* S. Brown, A. Walker.

BELFAST.—*2nd Class:* J. Watson, J. Williams.

GLASGOW.—*1st Class:* P. Stewart. *2nd Class:* C. Bainbridge, A. Fairley, J. Innes, W. Leishman, J. Macfarlane, J. Nicol, R. Turnbull, J. Walker.

NORTH SHIELDS.—*1st Class :* J. Ellis, J. Logan, W. Pigg, G. Read. *2nd Class :* F. Greagg, J. Johnson, R. Henderson, F. Honeyman, G. Lloyd.

SOUTHAMPTON.—*1st Class :* W. Fellows, K. Macfarlane.

LIVERPOOL. *1st Class :* R. Dyer, G. Edwards, N. Irwin, F. Love, G. Mercer, L. Roberts. *2nd Class :* T. Cuchell, C. Dennant, T. James, W. Stevenson.

CARDIFF.—*1st Class :* R. Bennell, W. Coombes, D. Davies. *2nd Class :* A. Cloke, T. Gimblett, H. Humphreys, T. Minchin, D. Powell, R. Read, H. Thomas.

LEITH.—*1st Class :* R. Douglas, A. Duncan. *2nd Class :* E. Gibbon, W. Lockhart, B. McLaren, J. Stark, J. Sutherland.

APRIL 9th, 1914.—LONDON.—*1st Class :* N. Clark, T. McGregor, A. Neall. *2nd Class :* S. Colinese, G. Wicks, S. Woods.

NORTH SHIELDS.—*1st Class :* E. Baty, G. Cairnes, R. Melhuish. *2nd Class :* A. Arrowsmith, J. Duncan, W. Gatiss, S. Hall, A. Mackinnon, J. Mather, G. Tullock.

LIVERPOOL.—*1st Class :* A. Bacon, W. Jarvis. *2nd Class :* J. Covil, W. Jones.

GLASGOW.—*1st Class :* G. Benzie, W. Boa, A. Forrest, W. Gemmell, W. Guy, W. Pollock, J. Robinson, K. Ross. *2nd Class :* A. Ballingoll, J. Brydon, J. Stenhouse.

APRIL 16th, 1914.—LONDON.—*1st Class :* J. Kendall, J. London, P. Miners, R. Newton. *2nd Class :* A. Arnold, R. Baker, R. Bissett, R. Clothier, G. Farrington.

SOUTH SHIELDS.—*1st Class :* H. Dixon. *2nd Class :* F. Barrington, G. Burgess, W. Corbett, N. Graham, A. Hall, A. Neilson, A. Norris, G. Stronghair.

GREENOCK.—*1st Class :* N. Gebbie, J. Niccol. *2nd Class :* A. Forrest, A. Gallie, R. McCracken, J. McVicar.

LIVERPOOL.—*1st Class :* S. Blaye, H. Pears, O. Smithson. *2nd Class :* G. Chatburn, L. Godfrey, D. McGraw, J. Ransom.

HULL.—*1st Class :* W. Cormack, S. Hall. *2nd Class :* W. Bristow, J. Leechman, S. Moorhouse, H. Steele, V. Vivian.

DUNDEE.—*1st Class :* D. Ferguson, J. McGregor, H. McKay, A. Malcolm, A. Porter. *2nd Class :* S. Boland, A. Johnston, W. Rollo, R. Webster.

April 23rd, 1914.—LONDON.—*1st Class :* F. Brotherton, A. English, R. Litster, J. Mayne. *2nd Class :* W. Clements, C. Hamerton, G. Spence, T. Wood.

GLASGOW.—*1st Class :* F. Curror, J. Lamont, C. Lennox, J. Simpson, J. Sterling. *2nd Class :* J. Calvert, J. King, R. McFeggan, A. Manson, A. Matheson.

NORTH SHIELDS.—*1st Class :* B. Finney, E. Flint.

SOUTHAMPTON.—*1st Class :* J. Carnegie, A. Donald, A. Spurrier. *2nd Class :* F. Bates, A. Paskins.

LIVERPOOL.—*1st Class :* E. Fleming, D. Forsyth, R. Nelson, F. Sharp, R. Whittle. *2nd Class :* W. Davies, J. Johnstone, T. Smith.

LEITH.—*1st Class :* A. Copland, J., Crook, G. Gibb, T. Wilson. *2nd Class :* L. Elliott, A. Hayes, L. Knowles.

WEST HARTLEPOOL.—*2nd Class :* R. Brunn, T. Snaith, H. Snowdon, C. Stone.

PLYMOUTH.—*1st Class :* S. Mann.

CARDIFF.—*1st Class :* F. Pizzarello. *2nd Class :* J. Court, T. Ferrari, B. Houghton.

April 30th, 1914.—LONDON.—*2nd Class :* H. Giles, V. Guesdon, F. Hoad, C. Howie, C. Ingersoll, W. Middleton, L. Windebank, N. Wood.

NORTH SHIELDS.—*1st Class :* B. Pearson, W. Ridley. *2nd Class :* O. Olsen.

LEITH.—*Extra 1st Class :* J. Ramsay.

SUNDERLAND.—*Extra 1st Class :* B. Hodgson. *2nd Class :* J. Etherington, P. Gill,

BRISTOL.—*1st Class :* W. Smaill.

HULL.—*1st Class :* W. Leaper. *2nd Class :* F. Haley.

LIVERPOOL.—*1st Class :* W. Barry, G. Glover, A. Jackson, S. Parker, W. Penney, J. Philips. *2nd Class :* B. Hepburn, R. Turner.

ABERDEEN.—*1st Class :* F. Rowlay. *2nd Class :* A. Esson.

GREENOCK.—*1st Class :* A. Anderson, W. Cunningham, J. Hughes, T. Lindegreen, W. Marshall, M. Milliken. *2nd Class :* T. Davis, J. Drysdale, D. Kvik, T. Milligan, D. Walker, W. Williamson.

May 7th, 1914.—LONDON.—*Extra 1st Class :* J. Cameron, H. Cranwell, R. Lawson. *1st Class :* A. Cruickshank, A. Fleming, J. Robertson, *2nd Class :* W. Evans, O. Graves.

NORTH SHIELDS.—*Extra 1st Class :* A. Grimshaw, J. Jarvie, J. Oxberry. *1st Class :* F. Marr, C. Robertson, J. Woodrow. *2nd Class ;* P. Driver, A. Mullen, T. Robson.

GREENOCK.—*1st Class :* I. Macdiarmid. *2nd Class :* J. Biggam.

CARDIFF.—*1st Class :* W. Clay. *2nd Class :* W. Lewis, E. Llewelyn, F. Stevens.

SOUTHAMPTON.—*1st Class :* J. Allens, W. Phillips. *2nd Class :* B. Creed, S. Hirschfeld, J. Short.

LIVERPOOL.—*1st Class :* J. Jones, B. Mackay. *2nd Class :* T. Bond, J. Clark, W. Danks, W. Evans, A. Houghton, W. Lott, J. Summer.

GLASGOW.—*1st Class :* J. Brewster, J. Cumming, A. Taylor. *2nd Class :* D. Bruce, J. Cameron, V. Kitson, G. Waugh.

BELFAST.—*1st Class :* M. Cooper, J. Holmes, I. Johnston, R. Pattison. *2nd Class :* J. Maginness.

LEITH.—*1st Class :* W. Greig, J Paterson. *2nd Class :* W. Low.

WEST HARTLEPOOL.—*Extra 1st Class :* R. Pickering, F. Tomlinson.

May 14th, 1914.—LONDON.—*1st Class :* E. Meikle. *2nd Class :* R. Duncan.

DUBLIN.—*2nd Class :* H. Campbell, P. Jamison.

HULL.—*1st Class :* J. Suggit. *2nd Class :* W. Hackett, A. Hirst, J. Martin.

GREENOCK.—*1st Class :* A. Brown, G. McCallum, J. McCracken, T. MacGibbon, A. Maitland, R. Polwarth. *2nd Class :* D. Blair, A. Gunn, J. Hutchison, R. Knox, H. Morrison, H. Paton, D. Small.

LIVERPOOL.—*1st Class :* T. Glencross, W. Mainwood, W. Mason. *2nd Class :* J. Levens, A. Low, R. Samples.

NORTH SHIELDS.—*1st Class :* T. Evans, R. Letbe, G. Potts. *2nd Class :* W. Campbell, E. Humphrey, E. Kelso, K. Macdonald, F. Paterson, T. Wainwright, J. Whitmore, N. Williamson, J. Wills.

BARROW.—*2nd Class :* W. Holmes.

DUNDEE.—*2nd Class :* R. Douglas, D. Fraser.

MAY 21st, 1914.—LONDON.—*1st Class :* E. W. Beacall. *2nd Class :* H. E. Lawrence, H. J. Nicholson.

BARROW.—*2nd Class :* W. J. Holmes.

GLASGOW.—*1st Class :* G. Gemmell. *2nd Class :* R. Clephane, R. McLellan, J. T. Muir.

CARDIFF.—*1st Class :* H. H. Pawley, W. Richards. *2nd Class :* J. B. Harries, H. G. Lewis, J. E. Roberts, J. M. Roberts.

WEST HARTLEPOOL.—*1st Class :* W. M. Alcock. *2nd Class :* G. L. Arnold, George E. Perrem, E. Wardman, W. B. Wright.

SOUTHAMPTON.—*1st Class :* A. Wilson. *2nd Class :* G. G. Cordiner, A. F. Green, T. Y. Mason.

LIVERPOOL.—*1st Class :* A. Deuchars, R. D. Drysdale, W. J. Jones, H. G. Parsell, D. J. Thomas. *2nd Class :* H. Acton, R. C. Cromie, A. A. Davidson, J. W. Evernden, S. H. Nicklen.

NORTH SHIELDS.—*2nd Class :* J. A. Black, A. J. Pegg, T. G. Prior, A. J. Wappet.

SOUTH SHIELDS.—*1st Class :* G. A. Graham, W. Spence.

LEITH.—*1st Class :* E. Campbell, H. Cockeram, J. McLaren. *2nd Class :* R. Angles, T. W. Baxter, R. Beatson, R. S. Cairns, G. L. Malcolm, W. Robertson.

MAY 28th, 1914.—LONDON.—*1st Class :* D. L. H. Collinson, J. H. Davidson. *2nd Class :* E. Burton, F. J. Colvill, W. A. Kidd, L. H. Reid, F. Turner.

BRISTOL.—*2nd Class :* J. A. J. Allen, E. W. Joachim, H. J. S. Smith, V. Walters.

NORTH SHIELDS.—*1st Class :* W. A. Colbeck, J. T. Gray, J. Smith. *2nd Class :* D. W. Anderson, D. Heppell, A. Mitchell, R. Parker, J. S. Peterson, H. L. Taylor.

HULL.—*1st Class :* A. J. T. Houghton, C. E. Thompson. *2nd Class :* F. Cook, J. Stark.

LIVERPOOL.—*1st Class :* J. A. Wakefield. *2nd Class :* H. Blandford, R. Nugent, P. Jeffes, T. A. Orton, J. Pratt.

GLASGOW.—*1st Class :* T. Drever, G. Green, T. L. R. Mackay. *2nd Class :* C. Bone, H. Brogan, A. Cameron, W. Forwell, W. D. Kerr, M. J. McLeod, J. McMillan, T. Orr.

SUNDERLAND.—*1st Class :* A. Wilkinson, C. H. Reed. *2nd Class :* C. G. Cramb, E. Tyson.

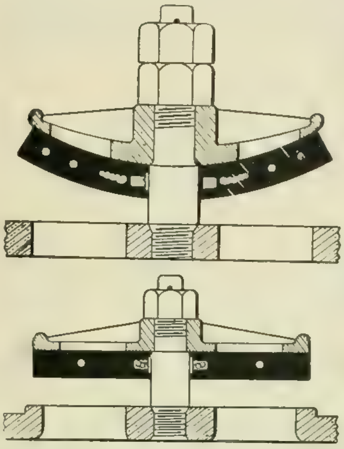
ABERDEEN.—*2nd Class :* F. Rae.

GREENOCK.—*1st Class :* H. Y. Service.

The Schmidt Superheater

HAS BEEN FITTED AND IS ON ORDER IN OVER 900 VESSELS.
IN ACTUAL SERVICE IT HAS REDUCED COAL CONSUMPTION 15 TO 30 PER CENT.
ABOUT 1,200,000 I.H.P. INSTALLED OR ON ORDER.

For full particulars apply to——
SCHMIDT'S SUPERHEATING CO. (1910), Ltd.
(Marine Dept.), 28, VICTORIA STREET, WESTMINSTER, S.W.



DERMATINE

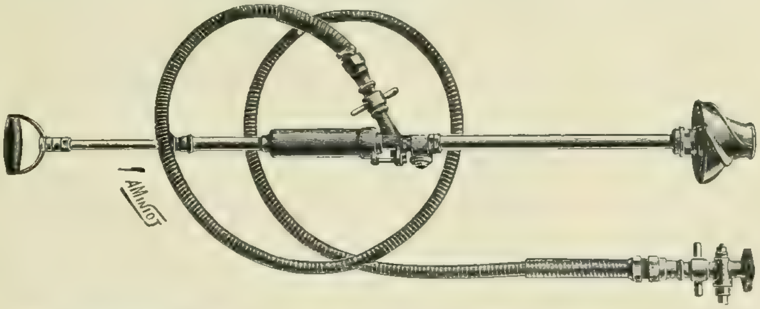
VALVES, Fitted with the G.M. Patent Anchor Bush, to protect the hole against excessive wear.
PRESERVE THE VACUUM MORE EFFECTUALLY THAN ANY OTHER VALVES.

Sole Manufacturers of DERMATINE HOSE, RINGS, BELTING, Etc.

DERMATINE Company Ltd.
93 & 95, NEATE ST., LONDON, S.E.,
ENGLAND.

ALWAYS OBSERVE
OUR TRADE MARK
THE HIPPOPOTAMUS ☛

TRADE MARK REGISTERED.
DERMATINE



DALMAR'S PATENT
Boiler Tube Cleaner
(MARINE TYPE. FOR SMOKE TUBES).

Soot is "rifled" out by a little steam and mainly Hot Air.
Special cut-off device for use at sea.
Perpetually clean tubes mean greater steam efficiency and coal economy.
Cleans as quickly as can be operated.
Always a New Broom to the fireman.

A. DUNCAN & Co., 98, VICTORIA ST., WESTMINSTER, LONDON.

Write us for Pamphlets of all types.
Special terms for trial apparatus.

James Howden & Co., Ltd., ENGINEERS, GLASGOW.
London Office: 9, Billiter Square, E.C.

Telegrams:
HOWDEN, GLASGOW.
TANGENTIAL, LONDON.

HOWDEN'S Patent Forced Draught
WITH THE LATEST PATENTED IMPROVEMENTS
Giving Increased Economy and Efficiency.

FANS,
ENGINES, RETARDERS,
SILLEY'S SMOKE-BOX DOORS.

In use by all
the Principal Steamship
Companies at Home and Abroad.

TOTAL POWER of Steamers fitted,
Over 14 MILLIONS I.H.P.

JOHN A. BREMNER & CO.

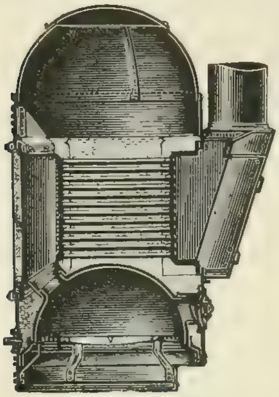
MANUFACTURERS OF ALL CLASSES OF
MARINE ENGINE, SPECIAL CYLINDER & VALVE

OILS.

WORKS: PENDLETON, MANCHESTER.
OFFICES: Tib Lane, Manchester.
" 79, Mark Lane, London, E.C.
" 19, Castle Street, Liverpool.

OFFICES: Bute Docks, Cardiff.
" 5, Quayside, Newcastle-on-Tyne.
" 196, St. Vincent Street, Glasgow.

USED BY ALL THE PRINCIPAL STEAM SHIP LINES.



Section of Cochran Boiler (Standard Type).

COCHRAN BOILERS

ARE THE MOST RELIABLE

Donkey Boilers.

All sizes up to 1,000 sq. ft. Heating Surface.

COCHRAN & CO., ANNAN, Ltd., Annan, Scotland.

Continued from p. viii.

LUBRICATORS.

LUBRICANTS AND OILS.
Bremner & Co., John A., Pendleton, Manchester.
Crane & Co., Ltd., P. Moir, Bank Street, Clayton, Manchester.
Vickers & Sons, Ltd., Benj. R., Gascoigne Street, Boar Lane, Leeds.

MANHOLE AND SLUDGE DOORS.
McNeil, Chas., Kinning Park Ironworks and Hydraulic Forge, Glasgow.

MARINE CLOCKS.
Dobbie, McInnes, Ltd., 57, Bothwell Street, Glasgow.
Heath & Co., Ltd., Crayford, Kent, and London.
Kelvin, Bottomley & Baird, Ltd., 16-20, Cambridge Street, Glasgow.

MARINE GLUE
Briggs & Sons, Ltd., W., Meadowside, Dundee.
Jeffrey & Co., Alfred, Marsh Gate Lane, Stratford, London, E.

MARINE OPTICIANS.
Heath & Co., Crayford, Kent, and London.
Henry Hughes & Son, Ltd., 59, Fenchurch Street, London, E.C.
Kelvin, Bottomley & Baird, Ltd., 16-20, Cambridge Street, Glasgow.

MARINE SALVAGE PUMPS.

MARINE SANITARY APPLIANCES.

MARINE SPECIALITIES.
Telford, Grier & Mackay, 16, Carrick Street, Glasgow.

MATTRESSES, ASBESTOS.
Cape Asbestos Co., Ltd., 23, King St., London, E.C.
Keenan & Co. Ltd., Matthew, Tredegar Road, Bow, London, E.
Toope's Asbestos Co., Ltd., Stepney Square, London, E.
Tuck & Co., Ltd., 61, St. Mary Axe, and 116, Cannon St., London, E.C.
Walker & Co., Ltd., Jas., Lion Works, Garford Street, West India Docks, London, E.

METAL MANUFACTURERS.
Atlas Metal and Alloys Co., Ltd., 52, Queen Victoria Street, London, E.C.
Broughton Copper Co., Ltd., Manchester.
Bull's Metal & Melloid Co., Ltd., Yoker, near Glasgow.
Delta Metal Co., Ltd., Delta Works, East Greenwich, London, S.E.

METALLIC TUBING.

MOTOR BOATS AND LAUNCHES.
Dickinson & Sons, Wm., Cathcart Street, Birkenhead.
Hayes, Edward, Wolverton Station, Stony Stratford.

NAUTICAL INSTRUMENTS.
Dobbie McInnes, 57, Bothwell Street, Glasgow.
Heath & Co., Ltd., Crayford, Kent, and London.
Henry Hughes & Son, Ltd., 59, Fenchurch Street, London, E.C.
Kelvin, Bottomley & Baird, Ltd., 16-20, Cambridge Street, Glasgow.

NAVAL TELEPHONES.
Graham & Co., Alfred, St. Andrew's Works, Crofton Park, London, S.E.
Kelvin Bottomley & Baird, Ltd., 16-20, Cambridge Street, Glasgow.

OIL REFINERS AND BLENDERS.
Bremner & Co., John A., Pendleton, Manchester.
Crane & Co., Ltd., P. Moir, Bank Street, Clayton, Manchester.
Vickers & Sons, Ltd., Benj. R., Gascoigne Street, Boar Lane, Leeds.

OXY-ACETYLENE BLOWPIPES.
British Oxygen Co., Ltd., Elverton Street, Westminster, London, S.W.

OXY-ACETYLENE WELDING.
British Oxygen Co., Ltd., Elverton Street, Westminster, London, S.W.

PACKINGS.
Beldam Packing and Rubber Co., 1 & 2, Gracechurch Street, London, E.C.
Cape Asbestos Co., Ltd., 23, King Street, London, E.C.
Chaplin & Co., G. H., 12, St. Helens Place, Bishopsgate Street, London, E.C.
Ferguson & Timpson, 104, Minories, London, E.C.
Greene, Tweed & Co., Queen Anne's Chambers, Tothill St., London, W.C.
Moseley & Sons, Ltd., David, Ardwick, Manchester.
Mosses & Mitchell, 122-124, Golden Lane, London, E.C.
Toope's Asbestos Co., Ltd., Stepney Square, London, E.
Trist & Co., Ronald, 4, Lloyd's Avenue, London, E.C.
Tuck & Co., Ltd., 61, St. Mary Axe, and 116, Cannon St., London, E.C.
United States Metallic Packing Co., Ltd., Bradford, Yorks.
Universal Metallic Packing Co., Ltd., Lidget Green, Bradford.
Walker & Co., Ltd., Jas., Lion Works, Garford Street, West India Docks, London, E.
Woodite Co., Mitcham Common, Surrey.

PAINTS AND ENAMELS
Anderson & Son, Ltd., D. 5, Victoria Road, West Hartlepool; and at London and Belfast.
Briggs & Sons, Ltd., W., Meadowside, Dundee.
Indestructible Paint Co., Ltd., Kings' House, King Street, London, E.C.
Wailes, Dove & Co., Ltd., 5, St. Nicholas Bldgs., Newcastle-on-Tyne.
Websters Ltd., Enamel Works, Hull.

PATENTS, DESIGNS AND TRADE MARKS.
Alexander & Sons, E. P., 306, High Holborn, London, W.C.
Brewer & Sons, 33, Chancery Lane, W.C.
White & Woodington, 221 to 225, Birkbeck Bank Chambers, London, W.C

PISTONS.
McNeil, Chas., Kinning Park Ironworks and Hydraulic Forge, Glasgow.

PISTON RINGS.
Lockwood & Carlisle, Ltd., Eagle Foundry, Sheffield.
Standard Piston Ring and Engineering Co. Ltd., Don Road, Sheffield.

PROCESS BLOCK MAKERS.
Direct Photo Engraving Co., Ltd., 38, Farringdon Street, London, E.C.

PROPELLER MANUFACTURERS.
Bull's Metal and Melloid Co., Ltd., Yoker, near Glasgow.
Cooper & Co. (of Hull), Ltd., Neptune Engine Works, Hull.
Delta Metal Co., Delta Works, East Greenwich, London, S.E.
Howden & Co., Ltd., James, 195, Scotland Street, Glasgow.

PROPELLER SHAFT COVERING.

PUBLISHERS
Brown, Jas., & Son, 52 to 58, Darnley Street, Glasgow.
Foyle, W. & G., 121-123 Charing Cross Road, W.C.
Griffin & Co., Ltd., Charles, Exeter Street, Strand, London, W.C.
Kelly's Directories, Ltd., 182-3-4, High Holborn, London, W.C.
Lockwood & Son, Crosby, 7, Stationer's Hall Court, London, E.C.
Longmans Green & Co., 39, Paternoster Row, London, E.C.
Potts, W. J., Atlas Works, North Shields.
Reed & Co., Ltd., Thos., 184, High Street West, Sunderland.
Sell's Directories, Ltd., 168, Fleet Street, London, E.C.
Sothern, J. W. M., 59, Bridge Street, Glasgow.

PUMP CLOSETS.
Low & Sons, Ltd., A., 78a, Merkland Street, Partick, Glasgow

PUMP CUPS.
Dermatine Company, Ltd., 95, Neate Street, London, S.E.
Woodite Co., Mitcham Common, Surrey.

PUMPS AND PUMPING MACHINERY.
Hayes, Edward, Wolverton Station, Stony Stratford.
Low & Sons, Ltd., A., 78a, Merkland Street, Partick, Glasgow.
Metallic Valve Co., Colonial House, Water Street, Liverpool.
Warner & Co. (Engineers), Ltd., R., Walton-on-the-Naze.
Weir, Ltd., G. & J., Cathcart, Glasgow.

Autogenous Welding and Cutting of Metals

BY THE

Oxy-Acetylene Blowpipe Systems.

Largely employed by Engineers for Marine and General Work.

For full Particulars apply to

The British Oxygen Co., Ltd.

WORKS AT

ELVERTON STREET, WESTMINSTER, LONDON,
TUNNEL AVENUE, EAST GREENWICH,
SALTLEY, BIRMINGHAM,
GREAT MARLBOROUGH STREET, MANCHESTER,
WALKERGATE, NEWCASTLE-UPON-TYNE,
ROSEHILL WORKS, POLMADIE, GLASGOW,
EAST MOORS, CARDIFF
SAVILLE STREET, SHEFFIELD, and SYDNEY, N.S.W.

Continued from page xx

PUNCHES.

RETARDERS.
Glasgow Patents Co., Ltd., Wellington Works, Kinning Park, Glasgow.
Howden & Co., Ltd., Jas., 195, Scotland Street, Glasgow.

ROTATORS.
Glasgow Patents Co., Ltd., Wellington Works, Kinning Park, Glasgow.

SHEETINGS.
Cape Asbestos Co., Ld., 23, King Street, London, E.C.
Trist & Co., Ld., R., 4, Lloyd's Avenue, London, E.C.
Walker & Co., Ltd., Jas., Lion Works, Garford Street, West India Docks, London, E.
Woodite Co., Mitcham Common, Surrey.

SHIP AND BOILER PLATES.

SHIPBUILDERS.
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.
Rutherford & Co., A., Neptune Works, Bridge Street, Birkenhead.
Thornycroft & Co., Ltd., John I., Woolston, Southampton.
Yarrow & Co., Ltd., Glasgow.

SHIP CHANDLERS.
Sharper & Robinson, Ltd., Victoria Terrace, W. Hartlepool.

SHIPPING COMPANIES.
Pacific Steam Navigation Co., Ltd., 18, Moorgate Street, E.C., 32, Cockspur Street, London, S.W., and Liverpool.
P. & O. Co., Ltd., 122, Leadenhall Street, London, E.C.
Royal Mail Steam Packet Co., Ltd., 18, Moorgate Street, E.C., 32, Cockspur Street, London, S.W., and Liverpool.

SHIP REPAIRERS.
Béliard, Crighton & Co., 7, Batavia Street, Antwerp.
British Oxygen Co., Ltd., Elverton Street, Westminster, London, S.W.
Cooper & Co. (of Hull), Ltd., Neptune Engine Works, Hull.
North East Coast Engineering Works (Hull), Ltd., Hull.
Rutherford & Co., A., Neptune Works, Bridge Street, Birkenhead.
Wallsend Slipway and Engineering Co., Ltd., Wallsend-on-Tyne.

SHIPS' MODELS.
Bassett-Lowke, Ltd., 112, High Holborn, London, W.C., and Northampton.

SHOVELS.
Fell, Clarence A., Fanshawe House, Dronfield, near Sheffield.

SKYLIGHT LIFTING GEAR.
Low & Sons, A., 78a, Merkland Street, Partick, Glasgow.

SMOKE BOX DOORS.
Howden & Co., Ltd., Jas., 195, Scotland Street, Glasgow.

SOUNDING MACHINES.
Heath & Co., Ltd., Crayford, Kent.
Kelvin, Bottomley & Baird, Ltd., 16-20, Cambridge Street, Glasgow.

STAMPINGS AND FORGINGS.
McNeil, Chas., Kinning Park Ironworks and Hydraulic Forge, Glasgow.

STAPLES.
Mosses & Mitchell, 122-124, Golden Lane, London, E.C.

STEAM LAUNCH BUILDERS.
Dickinson & Sons, W., Cathcart Street, Birkenhead.
Hayes, Edward, Wolverton Station, Stony Stratford.
Rutherford & Co., A., Neptune Works, Birkenhead.

STEAM PUMPS.
Warner & Co. (Eng.), Ltd., R., Walton-on-the-Naze.

STEAMSHIP LINES.
Pacific Steam Navigation Co., Ltd., 18, Moorgate Street, E.C., 32, Cockspur Street, London, S.W., and Liverpool.

STEAMSHIP LINES—Continued.
P. & O. Co., Ltd., 122, Leadenhall Street, London, E.C.
Royal Mail Steam Packet Co., Ltd., 18, Moorgate Street, E.C., 32, Cockspur Street, London, S.W., and Liverpool.

STEAM WHISTLES.

STEERING GEARS.
Brown Bros. & Co., Ltd., Rosebank Ironworks, Edinburgh.

SUPERHEATERS.
Schmidt's Superheating Co. (1910), Ltd., 28, Victoria St, Westminster, S.W.
Superheater Corporation, Ltd., 9, Bridge Street, Westminster, S.W.

TELEGRAPHS (SHIPS).
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancashire.

TELEMOTORS.
Brown Bros., & Co., Ltd., Rosebank Ironworks, Edinburgh.

TELEPHONES, NAVAL.
Graham & Co., Alfred, Crofton Park, London, S.E.

TORSION METERS.
Chadburn's (Ship) Tele. Co., Ltd., Cyprus Road, Bootle, Lancashire.

TUBE CLEANERS.
Bromell Patents Co., Ltd., Glasgow and Liverpool.

TUBES.
Broughton Copper Co., Ltd., Manchester.
Bull's Metal & Melloid Co., Yoker, near Glasgow.
Mosses & Mitchell, 122-124, Golden Lane, London, E.C.
Stewarts and Lloyds, Ltd., Glasgow and Birmingham.
Wilkes, Son & Mapplebeck, Ltd., Birmingham.
Yorkshire Copper Works, Ltd., Pontefract Road, Leeds.

TURBINES.
Howden & Co., Jas., 195, Scotland Street, Glasgow.
Wallsend Slipway and Engineering Co., Ltd., Wallsend-on-Tyne.
Westinghouse Co., London and Trafford Park, Manchester.

VALVES.
Auld & Sons, David, Whitevale Foundry, Glasgow.
Bailey & Co., W. H., Salford, Manchester.
Dermatine Company, Ltd., 95, Neate Street, London, S.E.
Low & Sons, Ltd., A., 78a, Merkland Street, Partick, Glasgow.
Metallic Valve Co., Colonial House, Water Street, Liverpool.
Mosses & Mitchell, 122-124, Golden Lane, London, E.C.
Ross, Wm. & Sons, 27c, Thistle Street, S.S. Glasgow.
Walker & Co., Ltd., James, Lion Works, Garford Street, West India Docks, London, E.
Woodite Co., Mitcham Common, Surrey.

VALVE RESEATING AND VALVE FACING MACHINES.
Bromell Patents Co., Ltd., Glasgow and Liverpool.

WELDING.
Anglo-Swedish Electric Welding Co., Ltd., Wood Wharf, Greenwich, London, S.E.
British Arc Welding Co., Ltd., Suffolk House, Laurence Pountney Hill, London, E.C.
British Oxygen Co., Ltd., Elverton Street, Westminster, London, S.W.

WINCHES.

YACHT (STEAM) AND LAUNCH BUILDERS.
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.
Dickinson & Co., Wm, Cathcart Street, Birkenhead.
Hayes, Edward, Wolverton Station, Stony Stratford.
Rutherford & Co., A., Neptune Works, Birkenhead.

Genuine Packings

FOR ALL CLASSES OF STEAM ENGINES.

INDIA-RUBBER GOODS

FOR MARINE WORK.

TUCK'S

TRADE

CAOUTCHOUC

MARK.

Asbestos Goods

PACKINGS, MATTRESSES, &c.

LEATHER HOSE AND BELTING.

LIVERPOOL: 32, Chapel St.

CARDIFF: 103, Bute Docks.

DUBLIN: Lower Abbey St.

NEWPORT (Mon.): Alexandra Dock.

BARRY: Barry Dock.

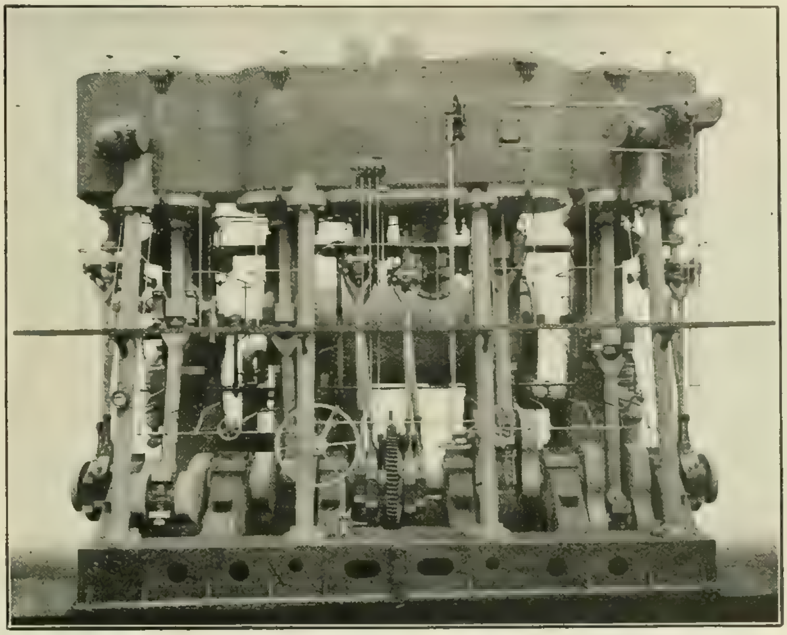
HULL: 10, Lowgate.

TYNE DOCK: Smith Street.

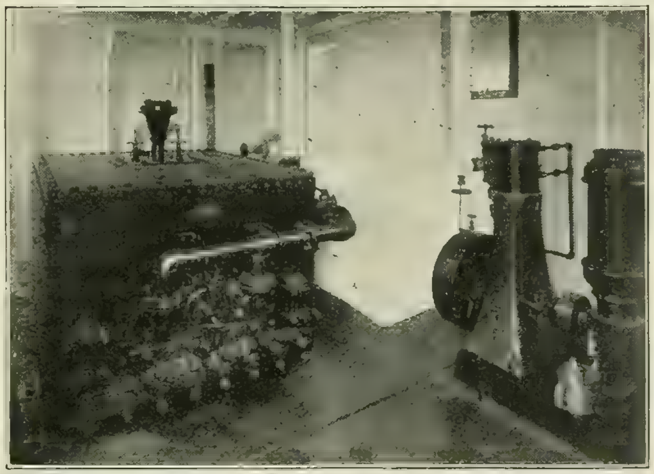
HEAD OFFICE and Ship & Contract Dept. 61, ST. MARY AXE, LONDON, E.C.

Contractors to British and Foreign Governments.

NORTH-EASTERN MARINE ENGINEERING CO., LTD.



WALLSEND-ON-TYNE & SUNDERLAND.



FIRE EXTINCTION and FUMIGATION.

WITHOUT DAMAGE TO CARGO.

Grimm Sulphur Dioxide Gas Machines.
A clean Bill of Health.
No Rats or other Vermin.
Apparatus Simple and Economical.
Apparatus Easily Operated.

Used by American, Hawaiian, Panama, Hamburg-American and other well-known SS. Lines.

Write for particulars to the Manufacturers:—

ARCHIBALD LOW & SONS, Ltd.
78a, Merkland St., PARTICK, GLASGOW.

Sole British Agents for the
FUMIGATING & FIRE EXTINGUISHING COMPANY OF AMERICA.

Ship Repairers, Engineers, Boiler Makers, &c.

Propellers a Speciality.

Vessels dry docked and painted or sheathed.

ESTABLISHED 1866.

COOPER & CO. (of HULL), Ltd.

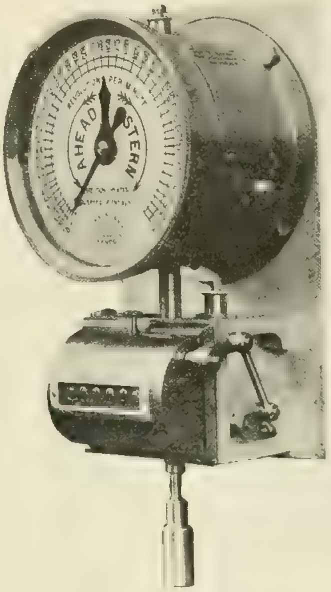
Telegrams:
NEPTUNE—HULL.
Nat. Tele. Nos. 381 & 460.
Corporation Telephone No. 381.

UNION DRY DOCK.
Branch Works: Alexandra Dock.
Head Office & Post add.: **Neptune Engine Works, HULL.**

Special Machinery for boring out Cylinders on board.
Electrical Welding and Compressed Air Plants fitted in Craft which can be taken alongside vessels.

PUBLISHERS' ANNOUNCEMENT.

The thirty-seventh annual volume of "The Marine Engineer" commences with the present number. Volume 36, August 1913, to July, 1914, comprising 500 pages of highly interesting matter, will be ready shortly, and orders are now being taken for delivery of volumes at the following rates:— 7/6 per vol.; by post, securely packed, United Kingdom and Canada, 8/-; other countries, 9/-. Binding cases may be obtained from the Publishers, price 1/6 each, carriage 4d. extra. A very complete index to volume 36 is issued with this number.



CHADBURN'S
(SHIP) TELEGRAPH Co. Ltd.

ENGINE TELEGRAPHS
STEERING TELEGRAPHS
LOOK-OUT TELEGRAPHS
DOCKING TELEGRAPHS

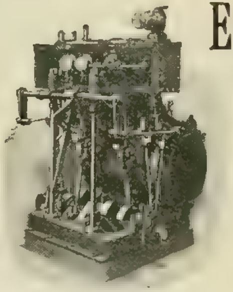
OVER **14,000** VESSELS FITTED

PATENT FLASH - LIGHT TORSION METERS FOR TURBINES

COMBINED SPEED INDICATOR AND DIRECTION TELLTALES

Head Office and Works
CYPRUS ROAD, BOOTLE Lancs.

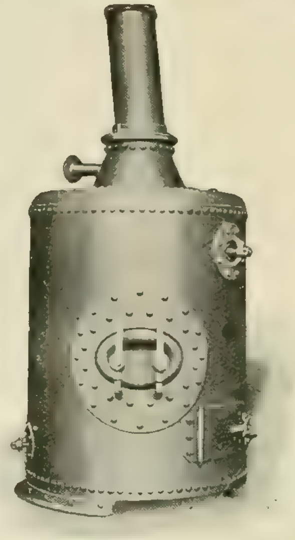
GLASGOW . . . 4, Finnieston Quay.
NEWCASTLE-ON-TYNE 16, Broad Chare.
BELFAST . . . . 39, Donegal Quay.
LONDON . . . . 4, Lloyd's Avenue, E.C.



EDWARD HAYES
Stony Stratford, Wolverton Station.

Marine Engines
Now Ready.
6 & 12 × 8 C.S.C.
7 & 14 × 9 C.S.C.
8 & 16 × 10 C.S.C.
9 & 18 × 11 C.S.C.
Boilers to Suit.
Maker to Admiralty, &c.

"Spencer-Hopwood"
WATER - TUBE LAUNCH BOILER.



Patentees and Sole Makers—
W. H. SPENCER & Co., HITCHIN, Herts.

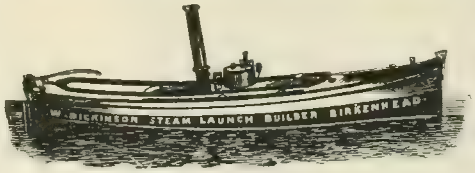
ROYAL NATIONAL LIFE-BOAT INSTITUTION,
Supported solely by Voluntary Contributions)

284 LIFE-BOATS NOW ON THE COAST AND THEIR CREWS MAINTAINED IN THE MOST PERFECT STATE OF EFFICIENCY.

Please Help the Life-Boat.

22, Charing Cross Rd., London, W.C.
GEORGE F. THEE, Secretary.

W. DICKINSON & SONS *Steam Launch, Yacht and Boat Builders, &c.*

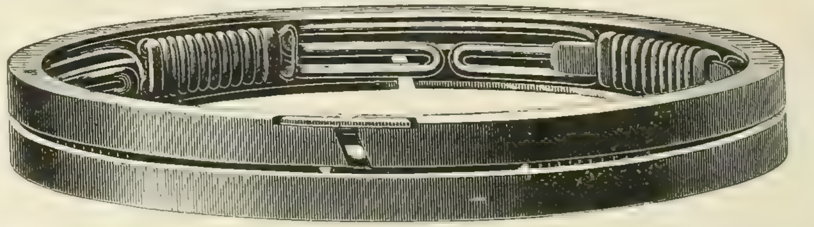

W. DICKINSON STEAM LAUNCH BUILDER BIRKENHEAD

Contractors to the Admiralty, War Department, The Crown Agents for the Colonies, and Foreign Governments.

Telegraphic Address—
'Dickinson,' Cathcart St., Birkenhead

LOCKWOOD & CARLISLE'S IMPROVED PATENT DOUBLE-ACTION METALLIC
PISTON PACKING RINGS AND SPRING.

The SPRING RINGS are SIMPLE and EFFICIENT, and are designed so as to have two distinct actions—one to press the Packing Rings outwards against the walls of the cylinder, and the other to press the Rings apart against the flat faces. Thus no inclined plane required in Rings.



HIGHEST AWARD, Inventions Exhibition, 1885.

GOLD MEDAL, Liverpool, 1886.

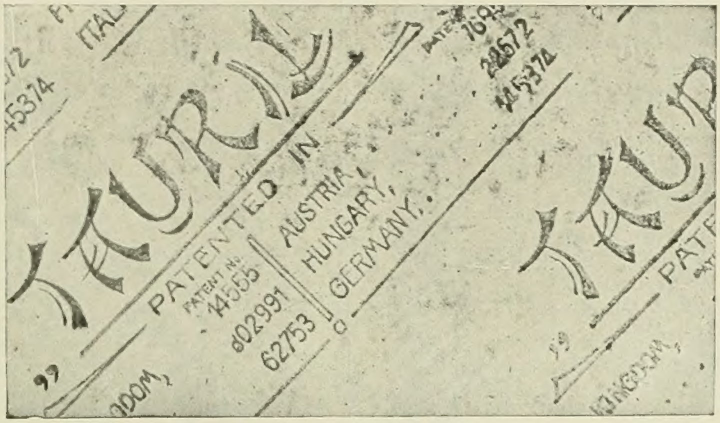
LOCKWOOD & CARLISLE, LTD.,
EAGLE FOUNDRY, SHEFFIELD.
Telegraphic Address: PISTON, SHEFFIELD.

Important to Consumers!

"TAURIL" JOINTING is made at our Factory only, which is equipped with Special machinery for its production, it is made only in the well-known buff colour and is stamped "TAURIL" with patent numbers all over sheet as facsimile print.

USED ON STEAMSHIPS ALL OVER THE WORLD.

The Standard Jointing Material for High-Pressure
STEAM,
SUPERHEAT,
AMMONIA,
CREOSOTE,
Etc.



Specify "TAURIL," the only patented Jointing of its class, and be sure you get it.

Saves all Joint troubles, can be used over again.

Sole Proprietors

50, Wellington Street,
GLASGOW.

FERGUSON & TIMPSON,

ENGINEERS,

Exchange Buildings,
Quayside,
Newcastle-on-Tyne.

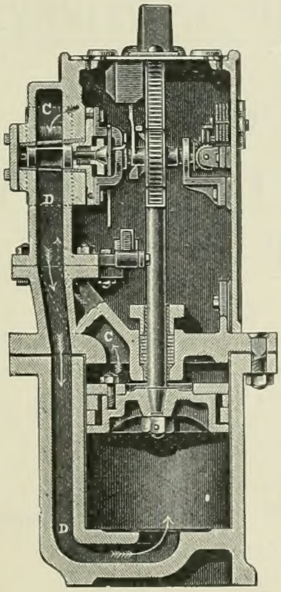
Telegrams { "Polaritora, London." "Polarity, Glasgow." "Tauril, Newcastle-on-Tyne."

104, Minories, LONDON, E.

Telephones { London. Avenue 1643. Glasgow: 1884, Argyle; 4454, Post Office. Newcastle-on-Tyne: 4667, Central.

GLENFIELD & KENNEDY, LD.

Engineers, KILMARNOCK.



THE KENNEDY HOT WATER METER

Enables most economical fuel to be selected.
Detects deterioration in quality of fuel.
Shows necessity for cleaning flues or tubes.
Detects inefficient stoking.
Indicates losses through engine defects.
Indicates losses due to surplus steam discharged at safety valve.
Indicates other boiler losses, such as leaky blow-off valve, etc.
Enables most economical cut-off in cylinder to be fixed.

ILLUSTRATED DESCRIPTIVE PAMPHLET ON APPLICATION.

THE TWO SISTER SHIPS
OF THE
S.S. "IMPERATOR"
(50,000 Tons)
THE TWO LARGEST LINERS
in the World,
are being Coated Exclusively
with **BRIGGS** Bi-tuminous
ENAMELS
AND
SOLUTIONS

THE WORLD'S RECORD
ANTI-CORROSIVES.

Patentees and Sole Manufacturers:
W. BRIGGS & SONS, LTD.,
DUNDEE & LONDON.

Electric Arc Welding
(Albrecht and Dantz System).

REPAIRS TO SHIPS, BOILERS, IRON AND STEEL STRUCTURES, CASTINGS AND FORGINGS.

UNCAULKABLE PLACES WELDED.

LANDING EDGES BUILT UP AND CORRODED SURFACES RESTORED.

Over **2000** REPAIRS since 1910, including the largest Electric Welding Repair known.

THE BRITISH ARC WELDING CO., LTD.
Registered Office—Suffolk House, Laurence Pountney Hill, London, E.C.

PLANT
at all
PORTS

LONDON—Regent Dry Dock, Millwall. Tele.—"Arcaweldo, London."

SOUTH SHIELDS—Wapping Street. Tele.—"Arcaweldo, S. Shields."

HULL.—North Bridge Dry Dock. Tele.—"Arcaweldo, Hull."

LIVERPOOL.—44, Chapel Street. Tele.—"Arcaweldo, Liverpool."

NOTTINGHAM.—Messrs. H. S. Saunders & Co., 1, Wheeler Gate. Tele.—"Bolts, Notts" and at SOUTHAMPTON.

BOILER ECONOMIES

ROTATING RETARDERS — SAVE COAL and LABOUR.
ELECTROGENS — STOP PITTING.
FEED FILTERS — PREVENT CORROSION.

THOUSANDS OF USERS.

Glasgow Patents Company, Limited,
Wellington Works,
Kinning Park, GLASGOW.

LONDON: 70, FENCHURCH STREET, E.C.
LIVERPOOL: DERBY SQUARE.
CARDIFF: 7, MOUNT STUART SQUARE.

BÉLIARD, CRIGHTON & CO.

ENGINEERS, BOILER MAKERS,
GENERAL SHIP REPAIRERS,
SHIPWRIGHTS, CARPENTERS,
ELECTRICAL ENGINEERS.
CONTRACTORS FOR DOCKING,
PAINTING AND SURVEYING.

Works: BATAVIA—NASSAU and AMSTERDAM STREETS.
Branch at CITY DRY DOCKS.
Offices: 7, BATAVIA STREET,
ANTWERP.

Reclassing of Steamers and Sailing Vessels at moderate prices a speciality.

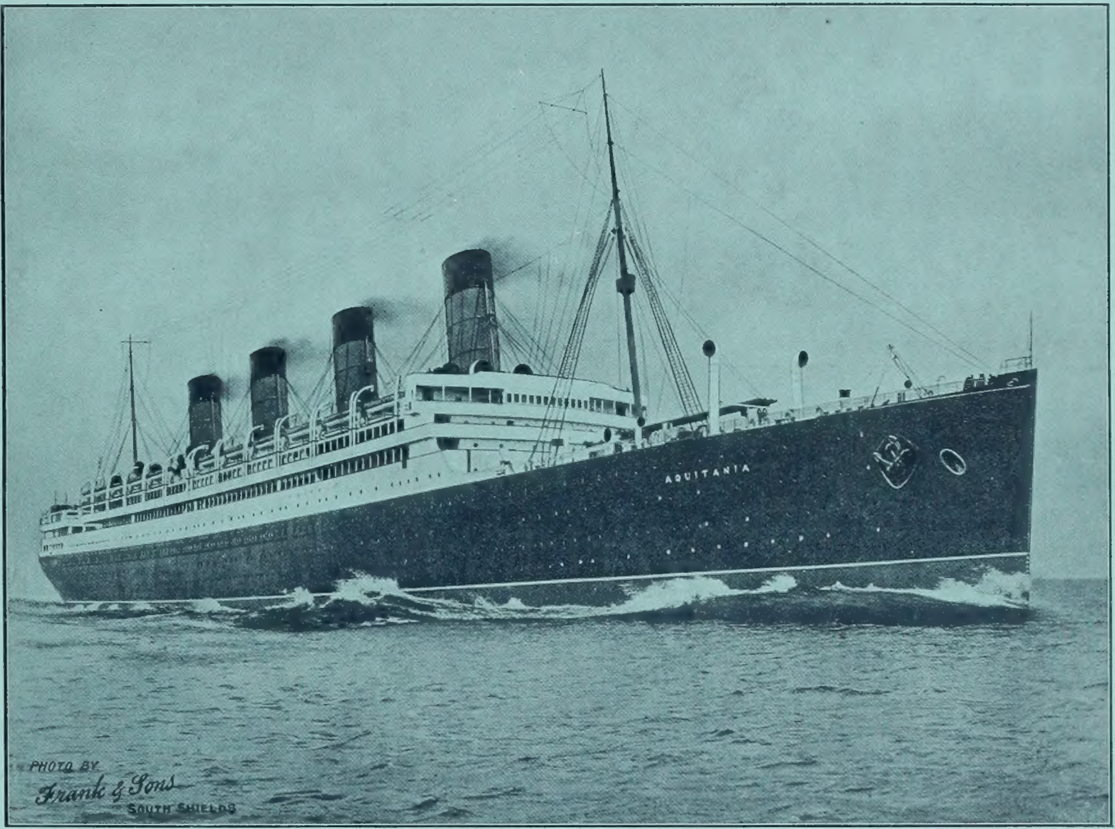
Tel. Add.—BELIARD, ANTWERP.

THE LARGEST AND LATEST CUNARD LINER

R.M.S. "AQUITANIA"

IS COATED THROUGHOUT WITH
WAILES, DOVE & CO.'S

"BITUMASTIC" ENAMELS & COVERINGS.



THE "WORLD'S RECORD" ANTI-CORROSIVES.

"BITUMASTIC" IS SPECIFIED BY THE BRITISH AND FOREIGN ADMIRALTIES AND LEADING SHIPOWNERS.

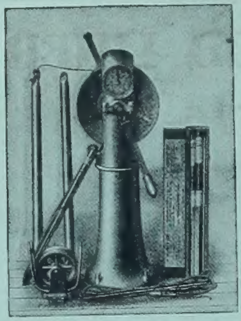
Write Sole Manufacturers for interesting Booklet.

WAILES, DOVE & CO., L^TD.

Also at London, Liverpool, Manchester, Glasgow, Cardiff, Birmingham, Leeds, Hull, etc., etc.

NEWCASTLE-ON-TYNE.

'Phones in every Office. *AGENCIES and STOCKS at Principal Foreign Ports.* *Telegrams: "BITUMASTIC."*



"Hezzanith"
Sounding Machines.

HEATH & CO., LTD.,
CRAYFORD, LONDON.

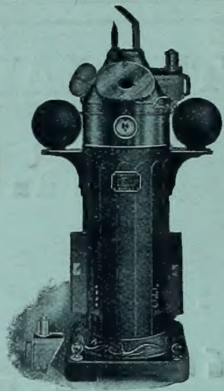
Cables and Telegrams: Polaris, London. Heath, Crayford.
Codes: ABC, 5th Ed. "Hezzanith."
Telephones: Dartford, 15 & 33 (Nat.). Bank, 287.

CATALOGUES FREE ON APPLICATION.

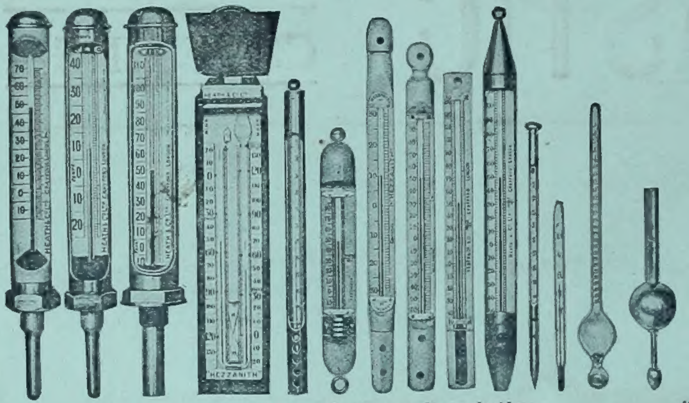
Grand Prix, Naval Exhibition, Bordeaux, 1907.

Trade Mark: "HEZZANITH."

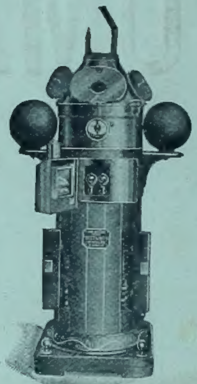
Gold Medal, Naval Exhibition, London, 1905.

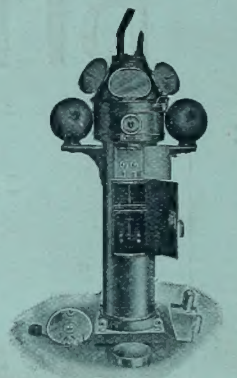


"HEZZANITH" MARK I.



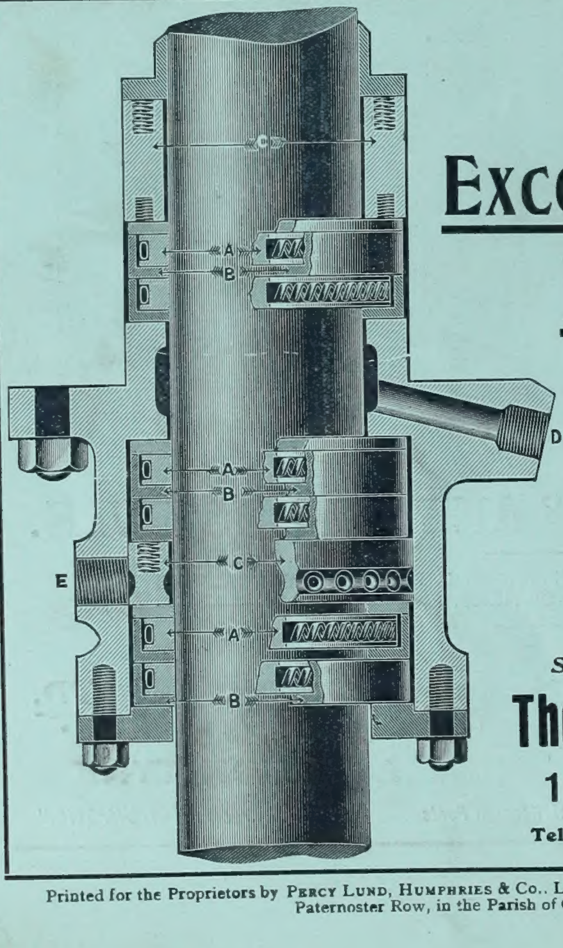
Thermometers of every description





"HEZZANITH" MARK II. "HEZZANITH" MARK IIB.

PLEASE SPECIFY "HEZZANITH" INSTRUMENTS IN OUTFITS AND REPLACEMENTS.



BELDAM'S
Excelsior Metallic Packing
Rings (Duplex Type),
FITTED THROUGHOUT THE
MAIN ENGINES
OF THE
WHITE STAR LINER
"BRITANNIC."

Sole Patentees and Manufacturers:
The Beldam Packing & Rubber Co.,
1 and 2, GRACECHURCH STREET, LONDON, E.C.
Telegrams—"CORRUGATED." 'Phone—5204 Avenue.

Printed for the Proprietors by Percy Lund, Humphries & Co., Ltd., The Country Press, Bradford; and Published at the Offices 3, Amen Corner, Paternoster Row, in the Parish of Christ Church in the City of London.—August, 1914. 19051